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Listerian Oration.[1]

THE HASTY HEART.

By SIR ALEXANDER MURPHY,
Brisbane.

THE names of men who have made notable contributions to knowledge are sometimes blazoned across the sky of their own generation, but with its passing they tend to sink below the horizon of the succeeding ones and are forgotten.

Joseph Lister, however, should be immortal, for no greater blessing has been bestowed on mankind in the realm of medicine than his gift of antiseptic surgery.

At the banquet given in his honour by the Royal Society in 1902 a perfect tribute was paid to him by the United States Ambassador. "My Lord", said Mr. Bayard, "it is not a profession, it is not a nation, it is humanity itself which, with uncovered head, salutes you."

No apology is needed for displaying his portrait, well known though it is to you. His features bear silent witness to the powers of perception of the poet Henley (at one time a patient in his Edinburgh wards), who in his poem "The Chief" thus described him:

> His brow spreads large and placid, and his eye
> Is deep and bright with steady looks that still.
> Soft lines of tranquil thought his face fulfil—
> His face, at once benign and proud and shy.

I owe a peculiar personal debt to Lord Lister. In my final oral examination in surgery the late Professor Sandes led by handing me a sound. I countered by identifying it as Lister's sound, and out flashed the next question: "Who was Lister?" Now it happened that in the preceding months I had thrice read G. T. Wrench's biography of the great man, so I told the professor who he was, and battle was joined. To my consternation he spent the entire period in an earnest endeavour to fault my knowledge of Lister, even to the details of his domestic life, thus fortunately leaving unprobed the many glaring gaps in my surgical armament, though I was in no condition to appreciate this at the time. Finally the bell brought an armistice, and he then informed me that the inquisition had been provoked by my predecessor, who had confounded him by stating that Lord Lister was a bacteriologist at the Lister Institute. Undeservedly and amazingly I was awarded credit in surgery, and ever since that incident have cherished the belief that some acquaintance with the history of medicine may at times pay unexpected dividends.

With the title of this oration many will find fault, and justifiably, for it deals only with auricular fibrillation (a

[1] Delivered at a meeting of the South Australian Branch of the British Medical Association on May 5, 1955, at Adelaide.

condition which has long intrigued me, and with which I can claim considerable experience), in which it is admitted that the ventricular rate may fall within the normal range; even then, however, many a contraction follows hard on the heels of a preceding one, and so haste is present.

It might be thought that the poets, to whom the heart has always appealed as a fruitful source of inspiration, would have offered countless appropriate labels; yet there is only one description known to me which seems to be based on, or can be applied to, the disorder under discussion. In Sir Edward Arnold's great masterpiece "The Light of Asia", Channa the charioteer says to Prince Siddartha of the sick man by the wayside:

> His heart which kept good time
> Beats like an ill played drumskin, quick and slow.

Fanciful? Well, it may be; but I like to think that Arnold had in some way encountered the arrhythmia, been intrigued by it, and endeavoured to set it to words.

With the exception of ectopic contractions, the extrasystoles of common parlance, auricular fibrillation is the arrhythmia most frequently encountered in practice. The first reference to its recognition clinically in British medical literature would appear to be in the *British Medical Journal* of November 27, 1909, when Thomas Lewis made a "Preliminary Communication" from which the following is extracted:

> In the late stages of mitral stenosis, and in cases of generalized cardio-vascular degeneration, the pulse is frequently continuously and extremely irregular. The type of irregularity is remarkable, in that in radial and cardiographic curves it defies analysis.
>
> Facts are now at my disposal permitting of the conclusion that the irregular pulse of mitral stenosis etc. already referred to is due to fibrillation of the auricles.

The theory of circus movement was evolved, and held almost undisputed sway until 1949, when Prinzmetal and his associates sounded its death knell with their observations of fibrillating auricles made by cinematography in colour at the incredible speed of 3000 exposures per second. They proved that in auricular fibrillation tiny muscle fragments contract asynchronously between 800 and 1500 times per minute, and that the fibrillation threshold is governed by two factors: (i) the rate of discharge from an ectopic focus, and (ii) the conductivity of the auricle.

A focus in the auricle, electrically stimulated, yielded ectopic beats, auricular tachycardia or flutter, according to the rate of stimulation, until the fibrillation threshold was passed. Similarly, the return to sinus rhythm may go through these stages in reverse order, slowly or rapidly.

Fibrillation is encountered in the following conditions:

1. Cardio-vascular degenerative conditions. Personal experience does not support Paul White's statement that hypertension and coronary disease are only occasionally complicated by this arrhythmia.

2. Rheumatic heart disease, especially mitral stenosis. It is encountered in aortic valvular disease, but comparatively infrequently. Frank aortic valvulitis with auricular fibrillation is an indication for careful search for concomitant involvement of the mitral valve.

3. Thyrotoxicosis.

4. Miscellaneous conditions, a small motley group including acute infections, dental sepsis, tobacco, alcohol, and *x*, the unknown.

Fibrillation can be paroxysmal or continuous, and while both types may occur without any ætiological factor being found, their development (especially that of the former) in middle or late life should always arouse the suspicion of thyrotoxicosis, the so-called "hot nodule" often being responsible.

What is the actual mechanism of auricular fibrillation? The literature exhibits a reluctance to explain it, denies any characteristic pathological changes in the auricles (Yater finding only occasional slight arteriolar sclerosis), and speaks of "unusual strain or nervous excitability".

It is difficult to escape the conclusion that relative ischæmia plays an important part, and an attempt to marshal evidence in support of this will now be made.

The auricles are supplied with blood by tiny branches of the right and left coronary arteries; therefore anything that materially lessens coronary flow proximal to the origin of these branches must exercise an effect. The impact of vascular degenerative processes often falls on the coronary arteries early in their course, so relative ischæmia can result from this.

Demand for increased blood flow beyond the capacity of normal vessels may be another cause. In mitral stenosis the left auricle is hypertrophied; the enlarged muscle fibres need more oxygen, its diffusion and the removal of metabolites are probably slowed, and intraatrial pressure is raised, leading to increased work.

Fibrillation is common in severe grades of narrowing of the valve orifice.

Cardiac surgery has now shown that fibrillation refractory to medical treatment sometimes becomes amenable to it following successful valvotomy, the effect of which, as far as the auricles are concerned, can only have been to reduce pressure within the chambers and improve coronary flow by increasing left ventricular output. This surely is confirmed by the patient with tight stenosis, who complains of "poor circulation", evidenced by coldness or numbness of hands and feet, easily induced fatigue of limbs, and rarely anginal pain. Valvotomy may ameliorate or even abolish these symptoms, and this may be attributed to a more generous ration of blood to starved and protesting tissues.

Another argument in favour of ischæmia is provided by the thyrotoxics. A young heart will meet very severe thyrotoxicosis for an amazingly protracted period without faltering; later in life, however, fibrillation is frequently associated with but slight degrees. Arterial changes accompanying the march of time, reducing the blood flow to the atria, or fibrosis of the muscle, the outcome of countless ischæmic insults, tender a reasonable explanation, for ischæmic cardiac muscle is irritable, and in such a state it seems fair to submit that its threshold falls.

Tobacco leads to vasospasm, elevation of blood pressure, and increased heart rate in many people, and while it often produces ectopic contractions from foci in the ventricles, and in rare subjects anginal pain, in some forms of coronary occlusion the auricles may be relatively the greater sufferers and so are provoked to fibrillate.

Quinidine tends to abolish ectopic contractions. By what means? Electrocardiography shows that it diminishes anoxic changes in anginal subjects. Quinidine is a vasodilator.

The subject must not be laboured further at the moment; but it is submitted that on circumstantial evidence ischæmia is suspect.

Can auricular fibrillation be converted to sinus rhythm, and if so, by what means? The first consideration would appear to be: is the condition with which it is associated reversible? The second: if it is reversible, will normal rhythm return?

Atherosclerosis provides a difficult problem, but there are indications that in certain individuals it is capable of amelioration. The effect of valvotomy in some sufferers has been described. Thyrotoxicosis often offers a convincing affirmative answer.

Failing the ability to reverse or alter materially these conditions, are there any drugs which may be effective?

Digitalis has long been used and often lauded; but when it has succeeded, it has done so only by virtue of its effect on congestive cardiac failure and by improving the blood flow to all organs, the atria included. The widely held, but erroneous, belief that it exercises a specific effect on fibrillation should be completely dispelled by Prinzmetal's finding that it depressed conductivity and increased the rate of discharge from an ectopic focus when the auricular rate was rapid, thus lowering the

fibrillation threshold, tending to convert flutter to fibrillation, and to perpetuate the latter.

It is interesting to note that previous empiricism is now shown to have had some scientific basis, for flutter was treated by the administration of digitalis until fibrillation appeared, the drug being then withdrawn in the hope that sinus rhythm would return.

Digitalis, then, provides no panacea.

Quinine was first employed by Wenckebach, but the credit must go to his Dutch patient with paroxysmal fibrillation, who in 1912 sought advice as to how the attacks could be prevented. When Wenckebach disclaimed knowledge of any prophylactic, the patient retorted that he at least knew how to terminate them, and gave a convincing demonstration of the fact with a dose of quinine. It appeared that he had suffered from malaria, and when he was taking quinine a paroxysm of fibrillation had occasionally occurred which he noted ceased within twenty to twenty-five minutes after a dose of the drug, and he then experimented on himself, finding 15 grains invariably effective.

Wenckebach employed it, but expressed disappointment with his results; however, Frey, using quinidine, the dextro-rotatory optical isomer of quinine, found it more satisfactory. Prinzmetal and his group noted that quinidine depressed conductivity in an auricle contracting at a controlled rate, but when fibrillation was established it slowed the rate of discharge from the ectopic focus and terminated the arrhythmia, in direct contradistinction to digitalis. Therefore, when exhibited it may lead to restoration of sinus rhythm through flutter and tachycardia.

When fibrillation is encountered, should an atttempt be made to convert it to normal rhythm?

True, meddlesome medicine is to be deprecated; but, even though the ventricular rate is within normal limits, cardiac efficiency and physical and mental comfort are lessened, so that unless the hazard of treatment outweighs probable benefit, conversion should be essayed. There is a sharp division of opinion on this; but the danger has been grossly over-emphasized, the two bogies raised being toxicity of quinidine and the possibility of embolism resulting from conversion.

Take quinidine first. Intolerance may produce nausea, vomiting, diarrhœa, tinnitus, vertigo or deafness. However, these are merely discomforts, and, unless severe, need not compel withdrawal of the drug. Allergic manifestations, including pyrexia and purpura, have been recorded, and respiratory arrest has been reported, but it is exceedingly rare and due to extreme sensitivity.

The chief warnings sounded are of bundle branch block, delayed intraventricular conduction, and ventricular tachycardia leading to ventricular fibrillation; but these are accompaniments of very high dosage.

Next, embolism. It is a well-recognized complication of congestive cardiac failure with normal rhythm, and its incidence is considerably higher when auricular fibrillation is present; some series reported 25% of patients being affected. Embolism being an inherent and ever-present threat, why should it be attributed to reversion to normal rhythm unless overwhelming evidence of this can be produced, which is not the case? It should be disregarded.

In 1936, Campbell and Gordon contributed an article to *The Quarterly Journal of Medicine* on the quinidine treatment of auricular fibrillation. Their conclusions were that past gross congestive failure, persistent signs of failure after rest and digitalization, pronounced cardiac enlargement, or fibrillation of more than six months' duration rendered a patient unsuitable for this form of treatment.

In spite of the fact that for long it had been my own practice to give what were then regarded as comparatively large doses of quinidine to such subjects with encouraging results, this pronouncement from Olympus proved somewhat arresting, and led to a retreat to a more cautious selection for a time; but confidence born of previous observation returned, former methods were resumed, and in consequence many patients who would have been rejected on the criteria quoted regained normal rhythm.

Few with extensive knowledge would now subscribe to Campbell and Gordon's views; yet they are still quoted without comment in Cecil's "Text-Book of Medicine", and even Gold in his "Quinidine in Disorders of the Heart" (1950) exhibits incomprehensive timidity, as he states that "in general it is considered unwise to attempt to abolish fibrillation after it has persisted for some weeks".

The fruits of twenty-five years' experience as visiting physician to in-patients at the Brisbane Hospital, and of a longer period of private practice, are now presented.

The majority of the patients with auricular fibrillation have belonged to the atherosclerotic group, hypertension being a frequent finding, and at times myocardial infarction.

Next comes rheumatic valvular disease, almost invariably mitral stenosis, either alone or with involvement of other valves. This does not mean that a greater proportion of sufferers from vascular degeneration develop fibrillation, but merely indicates that the incidence of this condition is far greater than that of rheumatic valvulitis in the community.

Thyrotoxicosis is third, but has become rarer in recent years, owing to advances made in its treatment by surgery and the antithyroid drugs.

Lastly, the miscellaneous group has provided a few instances, mainly idiopathic.

The best results have been obtained in the thyrotoxic patients, the next best in the atherosclerotic patients, and those with rheumatic valvular disease come last.

It has not been possible to devise any formula the application of which will permit the selection of patients in whom success may be predicted; but the following method has been evolved and has yielded gratifying results in the treatment of many subjects who must have been regarded as most unpromising. The patient is best admitted to hospital, but if conditions permit, treatment in the home is perfectly feasible. If congestive failure is present, it is first treated on appropriate lines with digitalis, diuretics, moderate salt restriction, and perhaps exchange resins.

In accord with a practice of very many years, based on the firm belief that œdema fluid is better in the legs than in the lungs, the patient spends a considerable part of the day in a suitable chair.

Whether failure has shown satisfactory response or not, after reasonable trial, a test dose of three grains of quinidine sulphate is given. Some hold that this is too large a quantity, as it can be lethal where intense sensitivity exists; but this is so rare that it carries no weight. If no immediate untoward reaction develops, the same amount is repeated at three-hourly intervals to 9 p.m. An occasional patient may show sinus rhythm on the following morning, in which case the "three grains three-hourly" dosage is continued, but if not, six grains are given at 6, 9, 12, 3, 6 and 9 o'clock, and this schedule is maintained for eight days before hope of conversion is abandoned.

Very much larger quantities have been used, especially in the United States of America, seven grammes or more being administered in a day; but personal trial has shown that of patients in whom 36 grains daily do not produce the desired effect, only very few will respond to higher dosage, and they will be almost certain to relapse soon. Further, they require most careful surveillance—the blood pressure must be recorded before each dose to detect significant fall, and a daily electrocardiogram taken—and altogether the increased work is not justified by the outcome. In any case, the regime is impossible in ordinary practice, and severely taxes even an efficient hospital organization.

Congestive cardiac failure of any grade has been no obstacle; repeatedly patients whose failure refused to yield adequately to accepted therapy promptly lost it when quinidine restored sinus rhythm.

To quote some case histories.

A married woman, aged fifty-five years, with rheumatic and atherosclerotic heart disease, had been aware of constant

irregular heart action for some years. She complained of dyspnœa, easy fatigue, "asthma", swelling of the feet, and inability to follow her occupation of music teacher, in spite of the fact that she had been treated for some time with "Digoxin" and injections of mercurial diuretics. Investigation disclosed retinal arteriosclerosis, hypertension, mitral (four) and aortic (three) systolic bruits, and gross cardiac enlargement. Admission of the patient to hospital, cessation of "Digoxin", and institution of quinidine therapy resulted in restoration of sinus rhythm on the fifth day of 36 grains daily. She resumed her occupation, and on a maintenance dose of 18 grains daily remained well and active for fourteen months, when over-confidence led to erratic medication and relapse.

An atherosclerotic male, aged sixty-one years, had had auricular fibrillation continuously for seven years. He was dyspnœic, with congestive failure, a blood pressure of 210 millimetres of mercury, systolic, and 130 millimetres, diastolic, and gross cardiac enlargement. Sinus rhythm was restored with 36 grains of quinidine daily, and has been maintained with this dosage for four years.

A female patient, aged fifty-six years, had had fibrillation for over a year, with a blood pressure of 192 millimetres of mercury, systolic, and 102, diastolic. She had considerable cardiac enlargement. Sinus rhythm was restored with 36 grains daily. Reduction of the dose to 18 grains resulted in relapse, with return to regular rhythm on resumption of the former dose.

A man, aged sixty-three years, hypertensive for years, had known that his heart action had been irregular for "a long time". For six months he had experienced dyspnœa and angina, for which digitalis had been prescribed. His blood pressure was 172 millimetres of mercury, systolic, and 118 millimetres, diastolic; moderate cardiac enlargement was present. With cessation of digitalis therapy, and the administration of 36 grains of quinidine daily, sinus rhythm returned and has been maintained for two years with three grains four times daily. He resumed work on his small cattle property, and has had no further angina, and minimal dyspnœa.

A labourer, aged fifty-seven years, with mitral stenosis, auricular fibrillation "for years", and moderate cardiac enlargement, was unable to continue work on account of dyspnœa. Sinus rhythm was restored on a dosage of 36 grains of quinidine daily. He resumed manual work for two months, when he tripped and fell heavily on his chest, with instant recurrence of fibrillation. He was successfully retreated, and returned to lighter work.

An instance of the idiopathic variety is provided by a banana farmer, aged forty-three years, who had had seven attacks of paroxysmal fibrillation, each following severe exertion. It then became established, and had been present for seven months. He complained of dyspnœa on exertion, and the ventricular rate at examination varied between 120 and 150 per minute. Sinus rhythm returned with a dosage of 36 grains of quinidine daily. He resumed this occupation at a somewhat lower level of physical activity, and the maintenance dose was reduced to three grains three times a day. Two years later he reported one relapse only, which he controlled by raising the dose to 18 grains daily. He has not been examined for some years.

From the foregoing it can be seen that heart size need not be considered. Quite often gross cardiac enlargement has been no bar to success, while hearts just outside normal limits have proved refractory. Similarly duration of the arrhythmia has seemed almost immaterial, and patients in whom it has been known to exist for years have responded to the initial course.

The maintenance dose after reversion varies with the individual. Broadly speaking, the longer it has taken to restore sinus rhythm, the greater will be the amount required. Many will need the full 36 grains daily, and this can be taken indefinitely without apparent harm. In others the condition may be held by nine or 12 grains, but they constitute a minority. It is better to exceed what seems to be the minimum requirement, as the impression is that with relapse restoration becomes increasingly difficult.

Should digitalis be exhibited concurrently? Some authors insist on its use as a guard against one-to-one flutter; others express the belief that the action of the two drugs is synergistic.

Long ago it became my practice to cease administration of digitalis on the institution of quinidine therapy, and in the light of recent knowledge this may have been the reason for many unexpected successes. To cause appreciable slowing of conduction in the bundle of His, a dose greater than that with optimum effect on cardiac muscle is possibly employed. Prinzmetal, as has previously been stated, has proved that digitalis lowers the fibrillation threshold, and tends to produce and perpetuate the arrhythmia; therefore its action may be antagonistic to that of quinidine rather than synergistic. Hence the suggestion is offered that if a first course has failed with the subject taking digitalis, its administration should be suspended and a second course of quinidine instituted.

Flutter has been frequent, but need not cause concern unless it is unduly prolonged with very rapid ventricular rate, and it has come to be regarded as a transitory phase in the process of reversion.

Toxic effects have been chiefly nausea and occasionally diarrhœa, but in surprisingly few instances.

Increasing numbers of ventricular premature contractions, delay in intraventricular conduction and auriculoventricular dissociation are all quoted in the literature as urgent indications for ceasing the administration of quinidine, frequent electrocardiographic examinations being counselled in order to detect their development. With the dosage here recommended their occurrence is most unlikely, and it may be employed with little fear of such complications.

The threat of embolism has too long been a sword of Damocles suspended over the heads of patient and physician. Far from being a deterrent, its occurrence can be taken as an indication for therapy. One swallow does not make a summer, but this story is arresting:

A male patient, aged fifty-seven years, with mitral stenosis, had had fibrillation for years. He had a hæmoptysis first in 1937, pulmonary embolisms in 1943, 1944, 1945 and 1947, a popliteal embolism in 1945, and was admitted to hospital in 1948 with cerebral embolism, his heart being moderately enlarged. Sinus rhythm was restored with 36 grains of quinidine per day, and maintained without any further embolic episode until 1953, when he died of congestive failure at the age of sixty-three years.

A different aspect is presented by a woman, aged sixty-seven years, with hypertension and fibrillation of some years' standing, who complained of dyspnœa and œdema of the legs. Her blood pressure at the first examination was 240 millimetres of mercury, systolic, and 160 millimetres, diastolic; her heart was moderately enlarged, her thyroid was hard and enlarged. Sinus rhythm was restored with 36 grains of quinidine daily, but this was reduced to 18 grains on account of nausea. Early one morning the night nurse noted that the heart had again become irregular, and three hours later a cerebral episode took place, resulting in hemianopia. With the resumption of former dosage, regular rhythm returned and has continued for over a year. Here it seems that return to fibrillation, not sinus rhythm, was responsible for embolism.

Admittedly other instances of embolism may have occurred, but they have either escaped notice or been at subclinical level.

The use of heparin is advocated by some as a preliminary measure, but no need has been seen for its use.

There have been two deaths.

The first death, some twenty years ago, was that of a woman in whom fibrillation persisted after removal of a toxic goitre. Quinidine (18 grains daily) gave prompt reversion to normal, but on the fifth day she was found dead in bed, and autopsy failed to disclose an embolus, nor was any message written on the dead heart.

The second death was that of a man, aged seventy years, with a history of past myocardial infarction, angina and fibrillation. After the 6 a.m. dose on the second day he complained of vertigo and nausea severe enough to warrant prompt suspension of treatment. By evening these had passed, and at 7.30 a.m., when sitting up in bed telling a relative how well he felt, he suddenly collapsed and died. No autopsy was performed.

Of these fatalities the first was probably due to quinidine, but the second is open to doubt. Their incidence in a large series of patients over a period of twenty-seven years can scarcely be regarded as significant.

It must not be thought that this regime has always met with success; far from it. There have been, there always will be, failures. But it is proffered with diffidence as a practical pattern for treatment of a common and often severely incapacitating disorder. It can be used in hospital or home without real risk to the patient or anxiety for the physician, and thus possesses the attributes of safety and simplicity.

Solely for this reason it may not be too presumptuous to hope that it might have appealed to the man whose name is honoured tonight, for his antiseptic method provided a beacon of safety for surgery, and its foundation was disarming in its simplicity—carbolic acid.

The Volume of the Sacred Law tells that a new king arose over Egypt, which knew not Joseph. Let us pray that no new generation in medicine shall arise which knows not another Joseph, Joseph Lister, whose name all men call blessed.

THE ASSOCIATION OF ALIMENTARY GLANDULAR HETEROTOPIA WITH ENTEROGENOUS CYSTS AND DIVERTICULA.

By REGINALD WEBSTER,
Royal Children's Hospital, Melbourne.

ALTHOUGH the precise embryological deviation involved in the genesis of enterogenous cysts and intestinal diverticula, other than the familiar Meckel's diverticulum, is somewhat obscure, there can be little doubt that non-Meckelian diverticula and enterogenous cysts are closely related, the basis of their affinity being a common origin from the developing gut. The classical diverticulum of Meckel differs from other congenital diverticula of the intestine in that, representing a failure, complete or partial, of obliteration of the vitello-intestinal duct, it is an expression of arrest of normal development, whereas other congenital intestinal diverticula embody the results of abnormal development.

Meckel's diverticula are observed much more frequently than other congenital diverticula of the intestine, but immediate discussion is restricted to those diverticula of the minority group which do not conform to the criteria requisite for their identification with the eponymous elect. Such congenital diverticula occur most commonly in the small bowel, and records of their location in the duodenum, jejunum and ileum, together with one instance in the vermiform appendix and sigmoid colon respectively, have been reviewed by A. Evans (1929) in well-documented fashion. Not merely should a congenital diverticulum be present at birth, but it should not be so described unless its structure reproduces that of the gut from which it opens, exhibiting mucous membrane, submucosa, a double layer of muscle, and serous covering. This is the fundamental distinction between true and false diverticula, the latter representing no more than hernial protrusions of mucous membrane at points of penetration of the muscular coat by the mesenteric vessels.

Heterotopia (Greek ἕτερος, other, different; τόπος, place) is the term applied to the growth of a particular type of tissue in an unusual situation, an anomaly of position which may be determined in either ante-natal or post-natal life. In its simplest form it is exemplified by the growth of sub-epidermoid cysts, induced by the mechanical transplantation of surface epithelium to a point beneath the dermis. In many of the post-natal heterotopias, however, and in the majority of those referable to the ante-natal period as developmental diversions, actual transference of cells, or groups of cells, has no better basis than surmise. Later discussion will endeavour to show that the majority of ectopic tissues stem from a vagary of differentiation, and that the process which results in heterotopia is one of heteromorphosis, or heteroplasia.

Heterotopia in the alimentary system is manifested by the occurrence at a given point in the alimentary tract of epithelial and glandular tissue, which, though foreign to that site, is normal to some other position in the alimentary canal or its accessory glands. It is a phenomenon particularly liable to materialize in connexion with intestinal cysts and diverticula, and the recent acquisition of a number of illustrative specimens suggested a review of others of their kind in the Museum of Pathology of the Royal Children's Hospital, with resulting revival of interest in the subject of intestinal heterotopia, and the problem in histogenesis which it presents.

Jejunal Diverticula.

Specimen I.

The specimen of which Figure I is a photograph, acquired in March, 1941, was resected by Dr. J. G. Whitaker from a baby, aged ten months, who had exhibited intermittent and severe melæna for one month prior to the laparotomy which determined the origin of the hæmorrhage. The operation revealed the presence of a cystic structure, of elliptical shape and measuring six centimetres from pole to pole, lying between the layers of the mesentery, its longer axis parallel with that of the bowel. A dimple in the mucous membrane of the intestine proved to be an ostium which, though very small, was patent, and indicated the malformation as a diverticulum rather than the cyst of first impression.

Manipulation essential to the adequate display of the specimen as a museum preparation involved some distortion, and the stoma, as it appears in the photograph, is of exaggerated size. At the apex of the diverticulum as pinned out for museum mounting is to be seen a small pyriform ulcer, unfortunately traversed by the incision which laid the diverticulum open. The differing appearances of the mucous linings of the intestine and diverticulum respectively, evident to macroscopic inspection and apparent in the photograph, suggested strongly that the mucosa of the diverticulum was not identical with that of the intestine from which it opened, an impression which was abundantly confirmed by the microscopic examination of sections.

Figure II reproduces a photomicrograph of the mucosa of the diverticulum. It shows a superficial covering of mucus-secreting cells, which differ from those of the corresponding layer of intestinal mucous membrane in that no goblet cells appear. Lying beneath the band of surface epithelium are numerous glandular tubules, the cells bounding which do not secrete mucus, and which in their shape and arrangement are indistinguishable from the central, chief or peptic cells of gastric tubular glands. Arranged at the periphery of many of the glandular acini, wedged in between the central cells and the basement membrane, are relatively large eosinophile cells with clear cytoplasm (Figure III). In their size, shape and position, these cells conform precisely with the parietal or oxyntic cells of fundal, as distinguished from cardiac and pyloric, gastric glands. The histological picture presented by the mucosa of the jejunal diverticulum may therefore be described fairly as a replica of that of the fundal type of gastric mucous membrane.

Comment.—As judged by its macroscopic appearance, the mucosal lining of the diverticulum was of the same nature throughout; but to have confirmed its homogeneity microscopically would have involved the sacrifice of the specimen and its loss to the museum. It is more usual—and the observation applies particularly to Meckel's diverticula—to find ectopic gastric mucosa in the blind end of a diverticulum of the intestine, and intestinal mucous membrane continuing through the stoma into the proximal portion. In such a situation ulceration is to be anticipated in that portion of the intestinal mucous membrane which adjoins the alien gastric mucosa, though it may be located a little distance from the junction, perhaps around the stoma, or even a short way along the mucous membrane of the bowel itself. In the particular instance under discussion the ostium is very small, and the heterotopic mucosal lining unusually rich in oxyntic cells—conditions which must have resulted in the stagnation within the diverticulum of highly acid secretion. Thus was determined, at the early age of ten months, ulceration in gastric mucosa lining a jejunal diverticulum.

Specimen II.

A boy, aged five years, contributed the second specimen, of which Figure IV is a photograph. The dominating clinical feature was intestinal hæmorrhage. The illustration shows

a short and blunt-nosed diverticulum arising from the mesenteric surface of the gut, its cap incised and laid back on a hinge of serous covering. A conspicuous feature is the hyperplastic character of the lining mucous membrane, which in its exuberant growth has reduced the lumen of the diverticulum to a very narrow channel. In the obverse, as shown in Figure V, the quality of the mucous membrane indicates the jejunum, rather than the ileum, as the locus of the diverticulum, and attention is at once arrested by the ulcer eroding the mucous membrane immediately around the stoma. Microscopic examination of sections of the mucous membrane of the diverticulum revealed histological findings identical with those of the first specimen, providing characteristic pictures of gastric mucous membrane, in which the distinctive oxyntic cells were not far to seek.

Comment.—Emphasis has already been laid on the hyperplastic quality of the ectopic gastric mucosa in this diverticulum. In a notable early communication on the subject of intestinal heterotopia, A. L. Taylor (1927) observed that in superficial heterotopia, which he defined as that lying within the *muscularis mucosæ*, there was no excess of tissue, the foreign epithelium merely replacing that proper to the part concerned. No doubt the authority who made this statement would now concur in its revision, for many examples of excessive and redundant ectopic gastric mucosa have been described in the literature, even as adenoma (Schullinger and Stout, 1934), and others will be examined in the group of specimens under present review. Hyperplasia of heterotopic gastric tissue in a diverticulum is not without its importance, as in addition to its leading to the elaboration of an excessive amount of acid secretion, it may well be a provocative factor in the invagination of a diverticulum, particularly of a Meckel's diverticulum.

Enterogenous Cysts.

Specimen III.

The third specimen furnishes an example of gastric heterotopia in a "mesenteric" cyst, removed by Dr. Bruce Hallows from a boy, aged eleven years. The pre-operative diagnosis was acute appendicitis; but when exposed the vermiform appendix was unconvincing as the basis of the clinically urgent abdominal emergency. Further exploration disclosed an abscess, localized by enveloping omentum, some distance medial to the ileo-caecal junction. It transpired that the suppuration had supervened on the perforation of a cyst, which was situated between the layers of the mesentery at an undetermined distance from the ileo-caecal junction; the cyst was contiguous with the bowel, but did not communicate with the intestinal lumen, and its removal involved no subsequent reparative measures with respect to the bowel.

Macroscopically the cyst was not very large—indeed, it was small as enterogenous cysts are regarded—being of tubular contour, and not more than five centimetres in its longest measurement. That it was a true enterogenous cyst was established by the identification of mucous membrane, submucosa, and circular and longitudinal muscle fibres on microscopic examination of sections. At the point of perforation the wall was peptonized and necrotic, and no pre-existing ulcer could be defined.

Comment.—In the single plane in which a section was microscopically examined, the cyst was lined throughout its entire circumference by fully differentiated gastric mucous membrane, replete with every histological detail necessary for its recognition. Figure VI shows the extent to which the prolific and rugous dystopic mucosal lining encroached on the cavity of the cyst. It is unusual to find such a well-preserved lining in an enterogenous cyst, for in cysts derived from the gut, as in cysts in general, distinctive features of the lining often suffer obliteration by the atrophy ensuing on intracystic tension. Perforation of the cyst in this instance may have been the result of necrosis induced by infection, or by hypersecretion of acid gastric juice and a process of autodigestion.

Specimen IV.

The fourth specimen, photographed to provide Figure VII, is a member of the group of enterogenous cysts commonly described as ileo-caecal cysts. In the photograph of the specimen as mounted for museum purposes, the vermiform appendix supplies a landmark; the ileum is seen to have been stitched to the ascending colon, and the anterior wall of the caecum reflected and maintained in position by sutures in order to expose the cyst within the *caput caeci*. Situated immediately distal to the ileo-caecal valve, the cyst proved an insuperable obstacle to the reduction of an ileo-colic intussusception, in the occurrence of which it no doubt played a provocative part. The necessary resection was successfully undertaken by Dr. Howard Williams in 1941. Earle Drennen (1931), in a report of three examples of ileo-caecal cyst and a review of 20 others which he found described in the relevant literature, noted that three of the 23 had precipitated ileo-caecal intussusception.

The size of this particular example may be gauged from its dimensions relative to those of the caecum of an infant, aged nineteen months. In diameter the roughly spherical cyst measured five centimetres, and it is seen from the illustration to arise from the posterior wall of the caecum and to project into the lumen. As essential to this communication the museum specimen was dissected sufficiently to determine that the cyst was attached to the caecal wall on a base approximately one centimetre in diameter, that it contained a small quantity of opalescent fluid, that its wall varied from one to two millimetres in thickness, and that its lining was smooth and shiny. No part of the cyst was incorporated in the muscular wall of the caecum, and subsequent microscopic examination of sections demonstrated its attachment to the caecal wall in the submucous layer.

FIGURE I.

Specimen I. Jejunal diverticulum lined by gastric mucosa. Pyriform ulcer at apex.

Despite the fact that in sections the cyst wall appeared as of little more than linear thickness under the coverglass, an epithelial lining, a narrow sub-epithelial zone, and musculature in circular and longitudinal layers could be clearly distinguished microscopically. The single layer of columnar epithelial lining was interrupted in places, but a notable degree of continuity was preserved, in view of the proverbial depredations of intracystic tension and inflammatory processes on the epithelial linings of such cysts. In the basal portion of the cyst, and for a distance covered by two low-power microscopic fields, the unicellular lining of the cyst broadened into a rudimentary mucous membrane (Figure VIII), in which a few glandular tubules were conspicuous. In one of the fields of imperfect mucosa the covering columnar epithelium presented a stratified appearance, no doubt due to the obliquity of the plane of the section; in the other it was in a single layer. The glandular tubules bore no resemblance to those of the mucus-secreting glands of

the large intestine, and contrasted in respect of this feature with those of the mucous membrane of the caecum, which covered the outer surface of the cyst for a short distance from its base of attachment. The remnant of mucous membrane in this portion of the cyst is clearly not intestinal in character, but is not of sufficient extent for its positive identification as a manifestation of heterotopia; it cannot be reconciled with the fundal type of gastric mucosa, but the few glands present convey a suggestion of pyloric glands.

Comment.—A proportion of the cysts described as ileo-caecal are, like Specimen IV, frankly caecal, and it would appear that the term ileo-caecal is to be interpreted in a topographical sense rather than as indicating the invariable implication of the ileum. Evans (1929) records

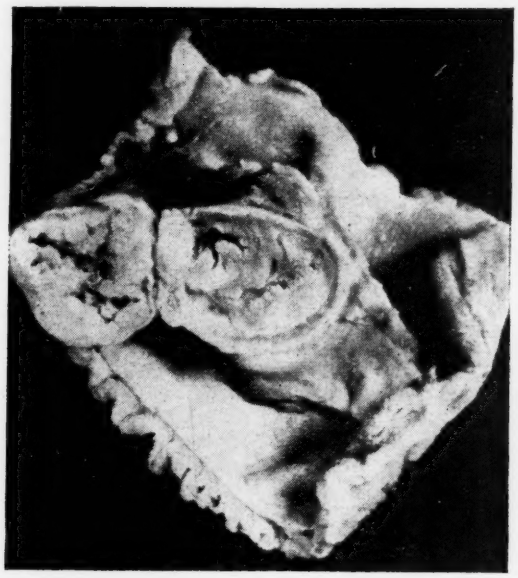

FIGURE IV.

Specimen II. Serous aspect of jejunum: diverticulum in line of mesenteric attachment showing hyperplastic gastric mucosal lining.

diagrammatically nine positions which cysts of the ileo-caecal region have been described as occupying. They may occur in any part of the caecum, at the ileo-caecal junction or in the adjacent ileum; they may project, sessile or pedunculated, into the lumen of the gut, or be situated beneath the peritoneum on either mesenteric or anti-mesenteric border; they may even lie within the mesentery, unattached to the bowel.

Origin of Enterogenous Cysts and Diverticula.

It is very probable that enterogenous cysts and diverticula, other than Meckel's diverticula, have a common origin, and that whether the result of the developmental aberration involved is a cyst or a diverticulum depends upon the loss or maintenance of communication with the bowel. Certain it is that jejunal diverticula such as Specimens I and II have nothing in common with the more frequently occurring Meckelian diverticula, the ontogenetic fault represented by which is clear. I adhere to the view that the situation of a diverticulum on or near the mesenteric border of the gut disqualifies it from consideration as a Meckel's diverticulum, and am not influenced by the bald assertion of Thomson (1937) that, though a Meckel's diverticulum is usually situated on the antimesenteric border of the ileum, it may be found at any point in the circumference of the bowel. There is an incredible laxity of definition of the term Meckel's diverticulum implied in the statement of Moses (1947), who in the year of grace 1947 wrote that the sac had been found "arising from all parts of the intestinal canal, from the cardia of the stomach to the rectum".

An apparently well-founded explanation of the origin of enterogenous cysts and diverticula is that based on the work of Lewis and Thyng (1908) and on earlier independent observations of Keibel (1905). Lewis and Thyng (1908) found pouch-like processes arising from the gut, and epithelial nodules in the endoderm in the majority of the early embryos of the rabbit, pig and man which they examined. The findings were confined to the small intestines with one exception, in which similar observations were made in the caecum. The workers named suggested that the persistence of such pouches might result in diverticula, and that cysts might be traced to central degeneration of the epithelial nodules.

Later, F. T. Lewis (1912) described the formation of diverticula in the jejunum and ileum as being initiated by the appearance of scattered "buds" or "pearls", alternative terms which he applied to foci of cellular hyperplasia in the endoderm of the embryonic intestine. A small cavity commonly developed in the centre of such a bud, which thereby became a "vacuole", later to gain communication with the intestinal lumen. At this stage the cells of the bud, which had not lost their identity in the process of formation of the vacuole, remained as a knob-like basal projection. These projections often showed a somewhat

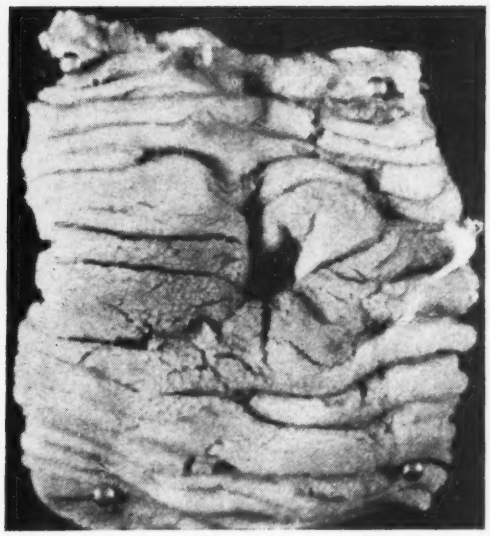

FIGURE V.

Specimen II. Mucosal aspect: ulceration around stoma of diverticulum.

constricted neck, and in their growth tended to asymmetry and to aboral advance along the intestine. By the enlargement of their necks the vacuolated buds became incorporated in the general epitheliel layer, with flattening out and disappearance of the pouches. However, occasionally a bud with its communicating cavity and basal projection retained its identity, to become the precursor of a diverticulum. The result to be anticipated from the persistence and subsequent growth of a bud which progressed to vacuolation, but failed to establish communication with the intestine, was a cyst.

Prior to the work of Lewis and Thyng (1908), diverticula in the embryonic intestine had been described by Keibel (1905), who noted and figured the two stages in their development — buds or vacuoles, and diverticula — and recorded their presence in the embryos of several mammals, including man.

In their investigation of 24 pig embryos Lewis and Thyng found that in the 5·5 to 14·0 millimetre stage, one or two knob-like diverticula occurred regularly in the duodenal region. In embryos of 14 to 24 millimetres, diverticula were more numerous and distributed along the small intestine. None was found in the large intestine, except in one 32 millimetre specimen, which exhibited a cluster of diverticula in the region of the caecum. In a human embryo of 13·6 millimetres, Lewis and Thyng noted a duodenal diverticulum below which there were indications of diverticula formation at 12 places along the small intestine. In a human embryo of 23 millimetres there were 33 well-developed diverticula in the course of the small intestine; there was none in the ileo-caecal region or in the large intestine. In a more advanced embryo 48 diverticula were counted in the portion of intestine which lay within the umbilical cord, and again no vacuoles or diverticula were found in the large intestine or in the vermiform appendix.

Cysts and diverticula associated with the bowel have been widely regarded as having their genesis in the persistence of embryonic endodermal vacuoles or pouches, which in the undeflected course of nature are ephemeral structures. It has been established by experience that a fully developed cyst or diverticulum may occupy any segment of the circumference of the gut—mesenteric, antimesenteric, or in any site between the opposing borders.

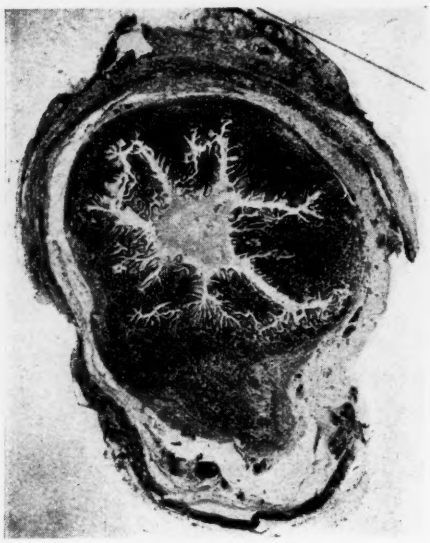

FIGURE VI.

Specimen III. Enterogenous cyst: cross section in low magnification: prolific mucosa of gastric histology.

Of the specimens presented, numbers I and II are diverticula opening from the mesenteric surface of the jejunum. Further, an enterogenous cyst may be located in any plane of the wall of the bowel—submucous, intermuscular, or subserous. Sometimes a subserous cyst, situated on the mesenteric border, loses its attachment to the bowel wall, but maintains a position between the layers of the mesentery, close to the bowel, as was the case with Specimen III, or more or less remote from it.

A. R. Evans (1929) reported clinical, operative and pathological details pertaining to a submucous cyst of the caecum, in its greater extent intracaecal, but partly intramural. He placed the cyst in the group commonly described as ileo-caecal cysts, and in a comprehensive review of enterogenous cysts and diverticula accepted without reserve the view of their origin based on the work of Lewis and Thyng, making no exception of ileo-caecal cysts. The criticism of H. R. Edwards (1929) of this teaching regarding the genesis of cysts and diverticula associated with the gut was that the findings of Lewis and Thyng were limited to the small intestine, with the exception of one instance in which a collection of pouches was found opening from the caecum. Further, the buds and vacuoles to which so much significance had been attached were found in the majority of embryos and were usually multiple, whereas both congenital cysts and diverticula were, in practice, very rare and always single.

It is to be noted also that the vacuoles and pouches in the endotherm of the embryonic intestine were described

FIGURE VII.

Specimen IV. Ileo-caecal cyst; for description see text.

by Keibel (1905) and by Lewis and Thyng (1908) as situated along the convex surfaces of the intestinal coils, opposite the mesenteric attachment—an important point which, in view of the topical vagaries exhibited by enterogenous cysts and diverticula, and the frequency with which they are located on the mesenteric surface of the bowel, reinforces Edwards's criticism and renders difficult of unqualified acceptance the view that enterogenous cysts and diverticula derive from the embryonic endodermal vacuoles and pouches of Keibel, and of Lewis and Thyng.

A relatively simple theory of the origin of enterogenous cysts, involving no restrictions regarding sites in which such cysts might be expected to appear, is that which presents them as sequestration cysts, and aligns them with cysts that develop as the result of ectodermal dislocation, such as the skin-lined cysts which appear in subcutaneous tissue, and frequently occur in the mid-dorsal line of the cerebellum as the result of inclusion of surface ectoderm during the sequestration of the neural canal. A similar developmental isolation of alimentary mucosal endoderm might reasonably be considered to lead ultimately to the growth of an enterogenous cyst or mucosa-lined diverticulum.

Meckel's Diverticula.

The association of epithelial heterotopia with Meckel's diverticula may be said to have become proverbial, so commonly has the presence of alimentary glandular tissue other than intestinal been observed in the mucosa, and so frequently do examples of the irregular alliance recur. Without doubt gastric mucosa of the fundal type is pre-eminent among the epithelial misplacements for which the mucosa of Meckel's diverticula is noted, but other obtruding tissues are gastric glands of pyloric type, duodenal mucosa distinguished by its glands of Brunner, lobules of pancreatic tissue, and ducts indicated by their histological features as bile ducts. Although depots of pancreatic tissue may occur in the mucosa, this particular variant lies much more frequently without the *muscularis mucosæ*, in the muscular plane of the diverticular wall, or even immediately under the serous covering.

That Meckel's diverticulum occurs in approximately 2% of individuals, exhibits a predilection for the male sex, and is located in the small intestine generally within three feet (90 centimetres) of the termination of the ileum, but occasionally as far as five feet (150 centimetres) away from the ileo-caecal junction, are trite observations, the reiteration of which is no doubt superfluous. At the same time the loose application of the term Meckel's diverticulum not infrequently encountered in the abundant literature dealing with the clinical manifestations of disease or accident involving this malformation, indicates the necessity for precise formulation of the criteria to which a diverticulum opening from the small intestine should conform in order to qualify for the eponymous designation. A diverticulum of the small bowel does not merit the description Meckel's diverticulum unless (i) it lies on the antimesenteric border of the ileum, within the permissible limit of distance from the ileo-caecal junction, (ii) is possessed of all the layers of the intestinal wall in regular arrangement in its structure, and (iii) can claim its own blood supply, derived from the superior mesenteric artery through its omphalo-mesenteric branch, which, as its name implies, traverses the diminutive mesentery of the diverticulum.

As providing illustrative data for this essay I have selected for review ten diverticula which, in that they meet the foregoing requirements, are properly to be presented as Meckel's diverticula. Seven have been acquired during the last four years and kindly made available to me by Dr. Alan Williams; three are museum specimens of older date. All exhibit heterotopia in striking degree, and in all but one the ectopic mucosa proclaims its gastric character in microscopic appearances. Nine of the ten children who furnished these specimens were boys, and the occurrence of Meckelian gastric heterotopia with resulting intestinal hæmorrhage in a girl is an incident to be noted, in view of the virtual monopoly of this pathological entity and its sequelæ by the male sex.

In six instances the clinical emergency which supervened on the presence of ectopic gastric mucosa, and the eroding effect of its acid secretion on the adjoining intestinal epithelium of the diverticulum, was intestinal hæmorrhage; in the seventh an ileo-colic intussusception followed invagination of the diverticulum, and a contributing factor in this accident was no doubt the small "raspberry" of gastric mucosa present at the tip of the diverticulum. In two diverticula the extraneous glandular tissue, in one conspicuous and in both indubitable, appears to have borne no relation to the clinical crisis which laparotomy determined as due to intestinal obstruction in one child, and to acute diverticulitis in the other. The tenth specimen of the group is a diverticulum of Meckel, the distal one-third of which is occupied by gastric mucous membrane which had never aroused clinical suspicion of its presence; the diverticulum was found incidentally in the course of an operation for acute appendicitis and removed at a later date as a precautionary measure.

It is proposed to consider the specimens in brackets determined by the clinical manifestations of the pathological features which they respectively exhibited.

Intestinal Hæmorrhage: Specimens V to X.

Specimen V.—The oldest specimen in the group is a museum preparation dating from April, 1936, and well worn by much handling in demonstration. It was resected by Dr. Russell Howard from a boy, aged thirteen years, who was admitted to the Royal Children's Hospital on account of a massive intestinal hæmorrhage which reduced the number of his red blood cells to 1,800,000 per cubic millimetre and his hæmoglobin value to 35%. Features of the diverticulum are (i) its length (12·5 centimetres), (ii) an ulcer (Figure IXA) in the mucosal lining just within the distal one-third of the diverticulum but not contiguous with (iii), an elevated tumour-like nodule at the fundus (Figure IXB), the exposure of which by hemisection of the diverticulum confirmed the strong impression of its presence gained by preliminary palpation. In subsequent microscopic examination of sections this tissue was identified as hyperplastic gastric mucous membrane, perfectly differentiated, despite its anomalous situation.

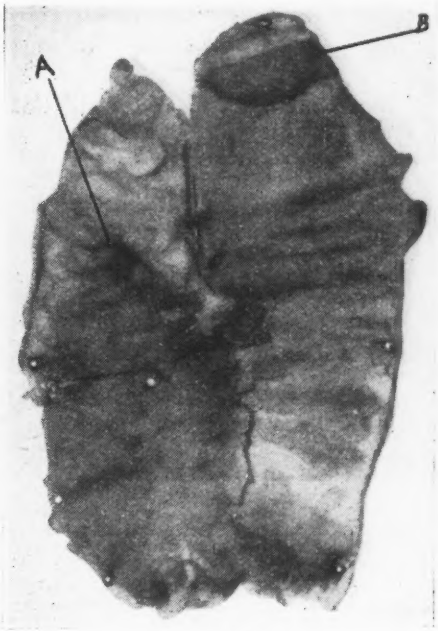

FIGURE IX.

Specimen V. Meckel's diverticulum. A. "Peptic" ulcer in intestinal mucous membrane. B. Gastric mucosa in sessile formation at apex.

Specimen VI.—Figure X reproduces a photograph of a very recent acquisition (January, 1955). The specimen is a Meckel's diverticulum resected by Dr. Murray Clarke from a boy, aged eight years, whose admission to the Royal Children's Hospital was determined by melæna of two days' duration. The diagnosis of hæmorrhage from either a Meckel's diverticulum or an intestinal polypus was reached after the failure of exhaustive hæmatological investigation to provide a clue to the origin of the hæmorrhage. Figure X shows the distal half of the diverticulum to be occluded by an exuberant growth of tissue, differing sharply in macroscopic appearance from the mucous membrane of the proximal half, which itself is exceptionally rugous and hypertrophic. Microscopic examination of sections reveals the excessively hyperplastic tissue in the distal half, which has reduced the lumen to a very narrow and sinuous track, to be gastric mucosa in full flower, and the unusually vigorous mucosa of the proximal half to be equally distinctive of intestinal mucous membrane. Situated in the intestinal mucosa and contiguous with the proximal edge of the ectopic gastric tissue is an ulcer, indicated by an arrow in the photograph (Figure X).

The next two specimens of Meckel's diverticula, determined histologically as harbouring ectopic gastric mucosa,

are described from "Kodachrome" projections secured by Dr. Alan Williams. Considerations of space preclude their reproduction.

Specimen VII.—A diverticulum of the lower part of the ileum, opening from the anti-mesenteric border of the gut, was disclosed by laparotomy as the source of melæna of two days' duration in a boy, aged eight years. Dr. Russell Howard resected the diverticulum, from the tip of which a long vascular band extended and gained attachment to the enteric mesentery. The mucous linings of the proximal and distal halves of the diverticulum are dissimilar and have been identified microscopically as respectively of ileal and gastric histology. A small ulcer, the macroscopic appearance of which bespeaks chronicity, is present at the junction of the two types of mucosa. The clinical notes record that at the time of removal of the diverticulum, an eroded and relatively large blood vessel was to be seen in the base of the ulcer, and that blood occupied the lumen of the ileum.

FIGURE X.

Specimen VI. Meckel's diverticulum: distal half lined by hyperplastic gastric mucosa: ulcer in adjoining intestinal mucous membrane indicated by arrow.

Specimen VIII.—Comparable with Specimens V and VI is that removed by Dr. Russell Howard in April, 1947, from a boy, aged seven years. Again the clinical story was one of recurrent melæna during a period of three and a half years, but other illnesses affecting the child necessitated repeated postponement of the operation for the removal of the suspect Meckel's diverticulum. Palpable thickening of the tip of the diverticulum was noted prior to its removal. The specimen shows a bulbous distal extremity, the mucous covering of which is of different macroscopic appearance from that of the remainder of the diverticulum. A small ulcer is present at the edge of the elevated tissue occupying the tip of the diverticulum. As was anticipated, microscopic examination of sections discloses the mucosa of the tip as gastric, and that of the proximal portion of the diverticulum as intestinal.

Specimen IX.—Another specimen in which "peptic" ulceration of a Meckel's diverticulum underlay copious and recurrent melæna is notable for its small size and the fact that it initiated intestinal hæmorrhage in a male infant aged sixteen months, an early age but by no means the youngest on record for this contingency. The very small diverticulum, three centimetres in length and of narrow lumen, exhibits an ulcer in the mucous membrane of the base, and is lined in the distal two-thirds by gastric mucous membrane lacking nothing in design and finish.

Specimen X.—The specimen now to be described is a Meckel's diverticulum of the short and broad-based variety occasionally seen, so short that it appeared externally as little more than a bulge in the wall of the bowel, and so broad of base that its removal could be effected only by the resection of the portion of bowel from which it opened. Described in the operation notes as "very sessile", this mound-like diverticulum was found on the anti-mesenteric border of the ileum, approximately 30 centimetres from the ileo-caecal junction, in a female infant, aged twelve months, who during the twenty-four hours preceding her admission to the Royal Children's Hospital had passed blood *per rectum* to the point at which her hæmoglobin value was 30%. Dr. Russell Howard on February 17, 1954, resected 10 centimetres (four inches) of the segment of the ileum carrying the diverticulum. Convalescence was uneventful.

When Dr. Alan Williams brought this specimen to my notice it had been for some time in formalin; the resected portion of bowel had been laid open by a longitudinal incision prior to the dispatch of the specimen to the pathology department, and on its receipt Dr. Williams obtained an excellent colour transparency of the mucosal surface of the bowel in the fresh state. Figure XI reproduces a photograph of Dr. Williams's "Kodachrome" projection. In the formalized state in which I received the specimen the mucosa of the bowel was everted, and shrinkage in the fixative had caused the opposing edges of the divided bowel wall to outfold and retract in a manner which made them appear partially to envelop the diverticulum. Reference to Figure XII should make this clear, and also enable it to be appreciated that bringing points A and B together, cranially as the section is placed, effects the restoration of the wall and lumen of the bowel.

FIGURE XI.

Specimen X. Mucosal surface of ileum showing the stoma of a Meckel's diverticulum reduced to two small ostia. See text.

Figure XI shows a pouting structure in the upper portion of the photograph, its smooth surface contrasting with the plications of the mucosa of the ileum. Within this smooth pouting region are two ostia, one larger and centrally placed near the right border, the other smaller and in a similar position relative to the upper border. Both these ostia open into the unpartitioned cavity of the diverticulum, shown in Figure XII, which represents a cross section of the specimen.

The unusual features of this specimen, rather difficult of verbal description, are such as to suggest an almost completely successful attempt at the closure of a very wide stoma by a bridge of intestinal mucous membrane, for,

despite its macroscopically smooth character, the mucosa in which the two ostia are set is indubitably of intestinal structure in microscopic appearances. The mucous lining of the diverticulum is just as unmistakably gastric, with the exception of that portion between the arrows in Figure XII, which is intestinal, and even in the very low magnification of the photograph can be seen to be of villous character. Figure XIII reproduces a photomicrograph of a section taken at a point marked X in Figure XII, and shows the intestinal mucous membrane bridging the originally wide stoma of the diverticulum, in juxtaposition with the ectopic gastric mucosa of fundal type, which lines the diverticulum throughout except the small segment included between the arrows. The bulging portion of bowel representing the diverticulum was incised on the serous surface to permit inspection of the mucous lining of the sac. No ulcer could be found within, and the absence of ulceration around the ostia and elsewhere in the resected portion of the ileum is evident from Figure XI.

Intestinal Obstruction: Specimens XI and XII.

Specimen XI.—Specimen XI, a Meckel's diverticulum of which Figure XIV is a photograph, was resected by Dr. Peter Jones from the lower portion of the ileum of a boy, aged four and a half years, who on arrival at the Royal Children's Hospital exhibited urgent and unmistakable signs of intestinal obstruction. The crisis was subsequently found to have been precipitated by incarceration of a loop of bowel under a fibrous band which extended from the tip of the diverticulum to the enteric mesentery, to which it was attached at the base. The illustration (Figure XIV) shows a rosette of elevated and engorged tissue in the mucosa of the tip of the diverticulum, which tissue histological examination of sections has demonstrated as gastric mucosa of fundal type, abruptly demarcated from the intestinal mucous membrane which lines the proximal and major portion of the diverticulum, devoid of any suggestion of ulceration. In this instance the clinically silent gastric heterotopia figures as an incidental finding, scarcely to be implicated in the particular emergency which led to its discovery.

Specimen XII.—The next specimen, a Meckel's diverticulum in which a deposit of ectopic gastric mucosa occupies the tip, is briefly and accurately described as a replica of Specimen XI. In this instance, however, the heterotopic tissue may perhaps be assigned a contributing role in the acute intestinal obstruction which gained admission to the Royal Children's Hospital in January, 1939, for a little boy, aged two and a half years, critically ill and in urgent need of surgical intervention. Prompt laparotomy revealed an ileocolic intussusception, of which the invaginated Meckel's diverticulum was the apex. Despite extravasation of blood and a measure of necrosis in the tissue of the apical portion of the diverticulum, dispersed glandular tubules conforming to those of fundal type gastric glands with oxyntic cells clearly recognizable, are to be found on microscopic examination of sections.

Heterotopia as an Incidental Finding.

Specimen XIII.—An interesting specimen is that obtained from a boy, aged four and a half years, who was admitted to the Royal Children's Hospital on March 30, 1951, for the specific purpose of removal of a Meckel's diverticulum, noted as present in the course of an operation for acute gangrenous appendicitis and spreading peritonitis performed in April, 1950. In the interval the boy remained well, having suffered neither pain nor melæna. Dr. Russell Howard found the tip of the diverticulum bound to the parietal peritoneum by adhesions, which were no doubt a legacy from the former peritonitis. When opened after removal, the diverticulum showed in its distal two centimetres a modification of the mucous membrane of a nature which strongly suggested gastric heterotopia, and the microscopic study of sections proved this impression to be correct.

Diverticulitis: Associated Pancreatic Heterotopia.

Specimen XIV.—The fourteenth specimen, and the tenth in the series of Meckel's diverticula, qualifies for inclusion in this review by virtue of the presence of pancreatic tissue in the wall. It was provided by a male infant, aged five months, who was admitted to the Royal Children's Hospital on February 4, 1953, acutely ill and of clinical aspect strongly suggestive of intussusception. The indicated laparotomy showed no existing intussusception, but disclosed the presence of a swollen and injected Meckel's diverticulum, with fibrinous exudate attached. The diverticulum, approximately three centimetres in length, was situated on the antimesenteric border of the ileum at a point about 60 centimetres (two feet) from the ileo-caecal junction. Routine post-operative histological examination failed in the search for heterotopic gastric glandular tissue in the mucosal lining, but demonstrated in the muscular wall pancreatic tissue, fully differentiated, of orthodox design in its lobules of acini, ducts and even islets (Figure XV).

In the case of the infant from whose intestine this diverticulum was resected with happy result by Dr. Russell Howard, acute Meckelian diverticulitis was all that the operation disclosed; but it remains a possibility that such diverticulitis resulted from an abortive invagination of the diverticulum, to which the pancreatic tissue in the wall contributed.

Commentary.

It will perhaps have been noted that in the nine diverticula of Meckel selected for discussion as exhibiting

FIGURE XIV.
Specimen XI. Meckel's diverticulum: "rosette" of gastric mucosa at apex.

gastric heterotopia, the ectopic mucosa is located in the distal portion, and limited indeed to the tip, in all but one (Figure X), in which it may be said to occupy the distal half. The late G. W. Nicholson, whimsical and erudite doyen of the Guy's Hospital school of pathology, than whom no one has written with greater authority on the subject of epithelial heteromorphoses in the alimentary tract, maintained (1922) that heterotopic formations as they affected persistent remnants of the vitelline duct were to be found exclusively in distal sites such as umbilical polypi and the apices of Meckel's diverticula, forging this observation into a pillar of support for his argument that heterotopic tissues are the outcome of abnormal differentiation of cells *in situ*, rather than the progeny of displaced cells. Nicholson's dictum relating to the restriction of heterotopic mucosa in Meckel's diverticula to the distal end is still applicable to the great majority of specimens, but must be qualified to admit the minority in which dystopic mucosa, usually gastric, figures as lining as much as half, or virtually the whole, of the diverticulum. Indeed, Nicholson himself in a later paper (1923) utilized for discussion a specimen of Meckel's diverticlum, which with the exception of a narrow band at the base, was lined by perfectly differentiated fundal gastric mucous membrane, and many similar specimens have been described by other writers.

It has been stated by Matt and Timpone (1940) that heterotopic tissue is present in approximately 25% of all Meckel's diverticula; but Lund, a Scandinavian writer quoted by Brookes (1954), estimates that 50% of Meckel's diverticula accommodate extraneous tissue. These figures

presumably include with the predominant gastric mucosa other tissues, such as pancreas, duodenal and colonic mucous membranes, and biliary duct formations, all of which have been reported as occurring in Meckel's diverticula, either alone or in combinations to which gastric mucosa may have contributed. Jay and his associates (1950), in a survey of the records of 103 patients in whom a Meckel's diverticulum persisted, found that gastric mucosa was present in 60% of those diverticula implicated in the production of symptoms; in clinically silent Meckel's diverticula, found incidentally at operation, and in those discovered at autopsy, the figures for the incidence of heterotopic gastric mucous membrane were 22% and 17% respectively.

It is probable that most of the recorded assessments under-estimate the frequency of occurrence of ectopic gastric glands in the mucosal lining of Meckel's diverticulum; its presence is not always as clearly indicated as in Specimens V, VI and XI (Figures IX, X, XIV), in all of which a strong impression of heterotopia was gained from macroscopic inspection. In those instances in which the alien gastric tissue is in the form of islets dotted about the mucous membrane of intestinal type which must be considered normal to the diverticulum, cursory microscopic examination of circular sections prepared from one or two points in the wall must often fail to reveal the heterotopia. In the presence of ulceration, the presumption that it is due to the action of acid gastric secretion may not be discounted unless microscopic examination of numerous sections, cut longitudinally to embrace the mucosa from apex to base of the diverticulum, fail to disclose the significant oxyntic cells of gastric fundus glands.

Ulceration.

The ulcers which, by the induction of what Sibley (1944) has described as Meckelian dyspepsia, hæmorrhage into the intestinal lumen or perforation of the wall of the bowel, and which commonly lead to the clinical discovery of obtruding gastric mucosa in that of a Meckel's diverticulum, are strictly analogous with the familiar "peptic" ulcers of the stomach and duodenum, and with those of common occurrence in the jejunum as sequelæ of gastro-jejunostomy. The term "peptic" ulceration is applicable to them all. Incidentally, it may be observed that this term is misleading, in that it implicates the ferment of the gastric secretion, rather than the real offender, the hydrochloric acid; but it would seem to be impregnably entrenched against any measure that could be devised to secure its modification.

Indeed, a Meckel's diverticulum harbouring ectopic gastric mucosa provides a miniature system in which the acidity of the gastric secretion as the dominant and essential factor in the pathogenesis and maintenance of ulceration is clearly demonstrated. That gastric glandular tissue, heterotopic in a Meckel's diverticulum, is functionally active has been incontrovertibly established by experimental studies, among which may be mentioned those of Dragstedt (1933). Further, it is an authenticated observation that the pepsin and acid-containing secretion of the heterotopic gastric glands is excited by the same secretory hormone as serves this purpose in the stomach itself, and at a time which coincides with the awakening of secretory activity in the stomach.

Both the stomach and the Meckel or other diverticulum containing wayward gastric glands of fundus type have their ulcer-bearing areas, which in general may be said to lie within the area of activity of the gastric secretion rather than in its field of production. No pepsin or hydrochloric acid is secreted by the glands of the cardiac or pyloric zones of the stomach, or by the glands of Brunner in the duodenum, the elaboration of these essential and distinctive constituents of gastric juice being a function solely of the glands of the fundus area, distinguished by their "chief" or peptic, and "parietal" or oxyntic cells. The sites of election for gastric and duodenal ulcers have been determined by countless observations as the pyloric area and the duodenal mucous membrane adjoining the pylorus. Their glands having no part in the secretion of hydrochloric acid and pepsin, the pyloric and duodenal mucosa is not so well conditioned to resist excessive acidity as the fundal mucous membrane, in the glands of which the secretion of acid and pepsin is exclusively vested. Very few ulcers are located in the fundal mucous membrane.

The situation in a diverticulum harbouring gastric glands rich in oxyntic cells is closely parallel, if not identical, with that which obtains in the stomach. The ileal mucous membrane of the proximal portion of the diverticulum is at the same disadvantage as the pyloric and duodenal mucosa, and is consequently more susceptible to erosion by acid gastric secretion than the fundal type gastric mucosa occupying the distal part. That "peptic" ulcers due to the presence of gastric mucosa in a Meckel's diverticulum are situated in the intestinal zone of the mucous lining, as in Specimen V (Figure IX, A), is the rule; most commonly the ulcer is found in that portion of the intestinal mucosa which adjoins the heterotopic gastric tissue, as in Specimen VI (Figure X). In those instances in which gastric mucosa usurps the greater part of the lining of a Meckel's diverticulum, ulceration occurs either in the fraction of ileal mucous membrane which has not been superseded, or within the lumen of the ileum in the vicinity of the stoma of the diverticulum. The close similarity between this situation and that which leads to the supervention of jejunal ulceration on the operation of gastro-jejunostomy needs merely to be mentioned to be appreciated.

Infants and children may be presumed to be spared the stress factor generally conceded to conduce to gastric hypersecretion and resulting excessive acidity; but their advantage in this respect is offset by the fact that the initiation of secretion in gastric mucosa heterotopic in a diverticulum is synchronous with its excitation in the stomach. Consequently the mucosa of the diverticulum, and particularly its vulnerable intestinal modicum, is bathed in acid secretion at a time when this usually diminutive and always superfluous viscus is empty and deprived of the protective neutralizing influence of food and bile. This would seem to be of first importance among the factors, if others there be, determining the early age at which "peptic" ulcers in Meckel's and other diverticula become manifest.

Of the six specimens of Meckel's diverticulum, Specimens V to X inclusive, grouped together as having been the sources of intestinal hæmorrhage, five exhibited ulceration. All of the children from whom they were removed were boys, the youngest being aged twenty months and the oldest thirteen years. Peptic ulceration of Meckel's diverticulum is noted for its occurrence in young subjects, but no age is exempt. An analysis by Johnston and Renner (1934) of the ages of 60 patients in whom the presence of an ulcer in a diverticulum of Meckel was definitely determined, showed an age range of five months to forty-five years. Approximately one-third (21) of the 60 patients were infants of ages not exceeding two years, and in the final reckoning 53 (85%) of the ulcers were found in patients aged under sixteen years. This figure approximates closely with that of Moses (1947), who in a composite review of 1605 patients possessed of a Meckel's diverticulum underlying clinical disturbance, found that peptic ulceration occurred in 496 (30·9%). Of these, 74% were aged under fifteen years.

As has been indicated, peptic ulceration was revealed as the source of the bleeding in five of the six diverticula of Meckel removed from children who exhibited intestinal hæmorrhage; but the sixth (Specimen X), an unusual specimen in which the stoma was closed except for the persistence of two small ostia, showed no breach of continuity in the intestinal mucous membrane of the resected length of bowel, or in the gastric mucosa lining the diverticulum. In the absence of any indication of diverticulitis, or clinical or pathological evidence of an abortive intussusception, the hæmorrhage, which was severe, must be presumed to have resulted from erosion of a vessel in the base of a small ulcer located in the ileum adjoining the

diverticulum, but not included in the resected portion. At all events, the resection of the diverticulum with its heterotopic gastric lining not only checked the hæmorrhage effectively, but obviated its recurrence.

Perforation.

Like the pyloric and duodenal ulcers of which they are counterparts, those induced in Meckel's and other intestinal diverticula by the acid secretion of obtruding gastric mucosa may culminate in perforation, but in all the eight diverticula—two non-Meckelian and six of Meckel type—which I have discussed as having given rise to intestinal hæmorrhage occasioned by peptic ulceration, surgical intervention forestalled the catastrophe of perforation. The only specimen in the series in which perforation occurred was Specimen III, an enterogenous cyst excavated from between the layers of the mesentery of the small bowel; in this instance no ulcer could be defined, and the focal dissolution of the cyst wall appeared to have been the result of a necrotizing inflammatory process.

Perforation of a diverticular peptic ulcer is often preceded by hæmorrhage, the significance of which clinicians have become progressively more disposed to investigate by laparotomy. Many disasters of perforation are now averted, and the incidence of this calamity, as recorded in reports of recent years, has declined notably. The earliest account of a group of cases of peptic ulceration in a Meckel's diverticulum of which I have knowledge is that of Humbert (1924), who reported one case and reviewed records of six others gathered from the literature. Five of the seven terminated in perforation. In the survey of Johnston and Renner (1934) in which reports of two cases of peptic ulceration of Meckel's diverticulum were added to 46 culled from the literature of the period 1907 to 1934, perforation is tabulated as having figured in more than half (27) of the 48 case reports comprising the series. A recent communication by Brookes (1954) deals with 43 cases of disease affecting Meckel's diverticulum in children, and of the 13 patients included in the peptic ulcer group only one incurred perforation. It is probable, however, that this complication will never be entirely eliminated, for it is not invariably preceded by warning hæmorrhage and may ensue rapidly on necrosis induced by acute diverticulitis. When it supervenes on peptic ulceration of a Meckel's diverticulum, perforation may be expected to be an accident befalling young subjects. Thomson (1937) collected 35 case reports of perforating ulcer of Meckel's diverticulum and added one. More than one-third of the patients were less than six years old, the age of the youngest being fifteen weeks. All but one were aged less than twenty years, and 31 of the 36 were males.

Intestinal Obstruction.

Specimens XI and XII are of patterns so similar that it is necessary to illustrate only one (Specimen XI, Figure XIV). Both show an apical rosette of heterotopic gastric mucous membrane, of sufficient substance to be palpable from without, and both diverticula played a leading role in the drama of intestinal obstruction; in one instance the heterotopia was unrelated to the crisis, in the other an accessory before the fact.

A Meckel's diverticulum may be implicated in intestinal obstruction in the following ways: (i) by the strangulation of a loop of bowel under the fibrous cord often attached to the tip of the diverticulum, should such cord retain the attachment to the umbilicus of the obliterated portion of the diverticulum of which it is a vestige, or affix itself to a coil of bowel or to the enteric mesentery (Specimen XI); (ii) by undergoing volvulus, in which the intestine may participate, especially if anchorage of the diverticulum to the umbilicus provides it with an axis of rotation; (iii) when stenosis of the intestine exists at the point from which the diverticulum arises; (iv) by the fantastic but authenticated knotting of a long and free diverticulum; (v) by evagination in the situation in which the diverticulum is patent at the umbilicus; (vi) and in the last, but by no means least, instance, by invaginating and thereby inciting intussusception (Specimen XII). In this particular example the invaginated diverticulum was found at the apex of an ileo-colic intussusception; but Harkins (1933) found in the relevant literature case records of several patients in whom invagination affected the diverticulum only, and of one in whom the remarkable phenomenon was observed that the diverticulum was not invaginated even though it formed the apex of an intussusception. In the course of a close analysis of 114 clinical reports of intussusception due to invagination of a Meckel's diverticulum, Harkins (1933) considered the role of tumour of Meckel's diverticulum in the provocation of intussusception. He found 49 tumours of Meckel's diverticulum on record, almost one-third of which contained pancreatic tissue. The subject of tumours of Meckel's diverticulum does not lie within the scope of this communication; but that the pancreatic tissue which figures so prominently in Harkins's data represents true neoplastic formation is open to question. Pancreatic tissue is so frequently a result of the abnormal differentiation underlying heterotopia, and has been so commonly observed in Meckel's diverticula, either alone or in association with gastric mucosa, that though its presence may well be a factor contributing to invagination, it must happen very rarely that it is present in the capacity of tumour, in the sense of neoplasm.

Harkins (1933) estimated that 17% of Meckel's diverticula that cause trouble do so by precipitating an intussusception. The local excess of tissue resulting from hyperplastic heterotopia, evident in the apical portions of the diverticula illustrated in Figures IX, X and XIV, may be presumed to operate in the familiar manner of true tumours of the intestine in inducing an intussusception. Despite the foregoing considerations, it remains true that in the majority of instances in which intussusception of the intestine ensues on invagination of a Meckel's diverticulum, no adjuvant factor such as heterotopia or tumour is involved. Donhauser and Kelly (1952), in a study of intussusception, found that in the adult Meckel's diverticula were excelled only by tumours as identifiable contributing agencies.

Incidental Finding of a Meckel's Diverticulum.

This experience illustrates the wisdom of the practice enjoined by many writers, that a Meckel's diverticulum found incidentally in the course of laparotomy (as exemplified by Specimen XIII) should be removed, provided that the condition of the patient is such that the additional surgery involves him in no undue risk. Specimen XI (Figure XIV) is another example of gastric heterotopia as an incidental finding, in this instance in a Meckel's diverticulum an adherent band from the apex of which was the prime cause of intestinal obstruction.

Heterotopia in the Small Intestine Apart from Diverticula.

It is important not to lose sight of the fact that gastric heterotopia productive of symptoms may occur in the small intestine apart from a diverticulum, though the event is rare. A. L. Taylor (1927), in discussing epithelial heterotopia in the alimentary tract, drew particular attention to an example in which gastric gland heterotopia was found in the mucous membrane of the lower end of the ileum of an infant, in a situation in the mesenteric wall of the bowel which rendered it extremely improbable that it was connected with a Meckel's diverticulum. Ulceration in the adjacent ileal mucosa led to fatal hæmorrhage.

A remarkable example of heterotopic gastric mucosa in the lower portion of the jejunum of a girl, aged nine years, was recently reported by Ramsay (1954). The foreign glandular tissue, revealed as the cause of attacks of subacute intestinal obstruction, was present as a tumour-like mass in the jejunal mucous membrane. The resected specimen was described as consisting of 10 centimetres of small intestine, with ribbed mucosa of typical jejunal pattern, interrupted in the centre, on the mesenteric border, by a rugose tumour resembling gastric mucosa. The dimensions of the conspicuous abnormal formation were given as 3·8 by five centimetres. Examination of a cross section of the gut determined that the hyperplasia

affected the mucous membrane only, there being no involvement of the submucosa or infiltration of the wall of the bowel. Histological examination confirmed the impression of the nature of the anomalous tissue gained macroscopically, and established it as gastric mucous membrane. Ramsay emphasized that the main symptom, colicky pain, possibly related to attempts at intussusception, was due to the presence of the "tumour" itself, and not to any change in the ectopic mucosa or in that of the jejunum in its vicinity.

The independent observations of Taylor (1927) and of Ramsay (1954) establish conclusively that though a diverticulum is the usual nidus for gastric mucosa misplaced in the small intestine, the presence of a pouch is not an essential condition precedent for the exhibition of this phenomenon.

Diverticulitis: Associated Pancreatic Heterotopia.

Simple diverticulitis as a pathological episode in a Meckel's diverticulum is relatively uncommon, and in Moses's (1947) drag-net review of the reports of 43 different authors relating to 1605 cases of clinically manifest disease affecting the classic cul-de-sac, the incidence of diverticulitis appears as 10·3%. The inclusion of Specimen XIV in the present discussion, however, was determined by the pancreatic heterotopia which it exhibits.

Aberrant or accessory pancreatic tissue is a very common manifestation of heterotopia in the alimentary tract. In the form of small, solid masses it has been found intimately associated with the wall of the stomach, duodenum, jejunum or ileum, with a relative frequency which corresponds with the order in which these divisions take their places in the alimentary canal. Though the stomach is conceded priority, the preferential margin held by this viscus is not very wide, and many instances of pancreatic heterotopia have been recorded in the small intestine. The alien pancreatic tissue is usually found, as is the case in Specimen XIV (Figure XV), in the muscular wall of the stomach or bowel, but by no means to the exclusion of the submucous and serous layers. Lying most often without the *muscularis mucosæ*, it is the most familiar example of "deep" as opposed to "superficial" heterotopia, the term employed to describe the situation in which a depôt of foreign glandular tissue lies within the *muscularis mucosæ*. The conjunction of superficial (gastric) and deep (pancreatic) heterotopia is an event of not rare occurrence in a Meckel's diverticulum; examples of the association have been reported by Taylor (1927) and by Bigelow and Clark (1950).

Interesting figures relating to the occurrence of heterotopic pancreatic tissue in diverticula of the alimentary tract emerge from a study by Hunt and Bonesteel (1934) of 186 examples of aberrant pancreas reported in the literature as situated in the gastro-intestinal tract. The authors named found that in 33 instances (17·7%) the site of the irregularly located pancreatic tissue was a diverticulum, and in no less than 26 cases the diverticulum harbouring the ectopic miniature pancreas opened from the ileum. The remaining seven of the diverticula so distinguished were distributed between the stomach (three), duodenum (three) and jejunum (one). In half (13) of the diverticula of the ileum containing aberrant pancreas, the diverticulum was reported as a true Meckel's diverticulum.

In the turgid condition of the acutely inflamed diverticulum under discussion, the presence of a nodule of pancreatic tissue was not appreciable macroscopically, though deposits of misplaced pancreatic tissue are commonly evident to inspection and palpation; they may on occasions attain dimensions such as have formerly led to their misapprehension as tumours. In the main the subject of accessory pancreas is one of academic rather than clinical interest, for the majority of recorded examples have been found in routine autopsy work, never having given rise to clinical manifestations. But accessory pancreatic tissue is not to be unconditionally denied clinical significance. In the example provided by Specimen XIV, entry of pancreatic secretion into the lumen of the Meckel's diverticulum may have been a factor contributing to the diverticulitis, and that ectopic pancreatic tissue in the wall of a Meckel's diverticulum may excite invagination and figure at the apex of an intussusception is a well-authenticated observation (Harkins, 1933).

Aberrant pancreatic tissue, though associated pre-eminently with the stomach, small intestine and diverticula of these segments of the alimentary tract, has also been described as occurring in the gall-bladder—a viscus which itself develops as a diverticulum of the duodenum—omentum and mesenteric fat, and in the capsule of the spleen. To account for extraalimentary deposits of aberrant pancreatic tissue, it seems necessary to postulate sequestration of groups of cells from the *Anlage* of the pancreas proper, and migration of such cells effected by the growth, and change of position relative to the pancreas, of the organ or organs with which they have become implicated. Foci of heterotopic pancreas within the gastro-intestinal tract are better explained as the outcome of developmental or post-natal epithelial heteromorphosis of cells indigenous to the site, a principle to be examined in the ensuing paragraphs.

The Nature and Histogenesis of Heterotopia.

Epithelial heteromorphoses of the alimentary tract are to be considered in the first place as developmental deviations from normogenesis, and secondly as modifications of cellular structure determined by post-natal influences, or more briefly, if less appropriately, as congenital and acquired. In that it is amenable to study, and has provided objective evidence in support of theory formulated to explain the histogenesis of the developmental type, heterotopia clearly assignable to post-natal causes has proved of perhaps the greater academic interest and importance.

The epithelial heterotopias of ante-natal and post-natal origin have the fundamental feature in common that both express the reaction to unusual stimuli of epithelial cells, which at the time of their subjection to these agencies are actively multiplying. The cellular proliferation which is the essence of embryonic life has its counterpart in the rapid multiplication of cells involved in reparative processes. Thus it eventuates that gastric mucosa ectopic in the intestine and intestinal villi wayward in the stomach of a newly born infant have their opposite numbers in pathological processes in the adult, as witness Nicholson's (1923) description of gastric glands in a tuberculous ulcer of the colon, and in the same paper his substantiated emphasis on the frequent occurrence of gastric glands in chronically inflamed gall-bladders; as witness also the confirming and amplifying observations of King (1952) in his study of *cholecystitis glandularis*, and the report by King and MacCallum (1934) concerning pancreatic tissue in the wall of the stomach. King and MacCallum's communication was based on their study of specimens acquired from four patients whose ages ranged from thirty-seven to fifty-three years, and its burden was the proof of the contention that the pancreatic tissue demonstrated in the walls of the several stomachs did not arise during embryonic life, but was an expression of the metaplasia frequently observed in cells incited to proliferation by chronic inflammation.

Heterotopia of character illustrated by specimens of the type described in this communication has been revealed so early in post-natal life, very often within the first twelve months and not uncommonly at an age expressed in weeks, that it must be considered a manifestation of teratogenesis. A facile explanation, associated with the name of Shaetz, of the manner in which it originates, is that early in embryonic life rotating movements of the embryo effect displacement of certain cells of the endoderm of the developing alimentary tract, and their reimplantation at narrowed points in the system, notably in the obliterating vitelline duct; other diverticula such as those of Keibel (1905) and of Lewis and Thyng (1908), described earlier in this paper, might be expected similarly to entrap unattached cells, if the possibility of their detachment is allowed. The trenchant criticism of Nicholson (1922) should suffice for the rejection of this hypothesis.

Obliteration of the vitelline duct, or that degree of closure which eventually is to obtain, is normally effected in the seventh or eighth week of embryonic life, the milestone being passed long before the endoderm shows the least sign of differentiation into glands, a process not initiated until towards the end of the fourth month. In the meantime, the diverticulum resulting from total or partial failure of the vitelline duct to achieve occlusion is possessed of an endodermal lining which in the normal course of events will differentiate to form intestinal mucous membrane. The first point advanced by Nicholson (1922) against the theory that gastric heterotopia discovered in persistent remnants of the vitelline duct resulted from the supplanting of endodermal cells which would normally evolve as intestinal mucosa, by emigrant cells predestined to form gastric glands, was that it was physically inconceivable. He adduced as conclusive the work of Meyer (1905), which showed that it is a mechanical impossibility for the cells of a developing tube to carry away with them others to which they have become abnormally closely adherent. In his second objection to the theory which would replace distant endodermal cells by unattached cells predetermined as harbingers of gastric tissue, Nicholson (1922) challenged the implied assumption that all the parts of the fully developed alimentary canal were already mapped out in the corresponding regions of the embryo in the earliest days of its formation; this he dismissed as carrying the doctrine of preformation to an "unwarrantable and absurd conclusion".

The essence of the now prevailing view of the histogenesis of epithelial heteromorphoses of the alimentary tract is the conception, original with Albrecht, that the cells of the endoderm lining the primitive intestinal tube, the vitelline duct, and diverticula other than that arising from incomplete obliteration of this structure, are possessed of the potentiality for developing into any of the glandular structures of the adult intestine and its accessory glands. When the endoderm is first defined in the embryo its cells are endowed with a polyvalent potency for differentiation, a term which embodies a fundamental concept in embryology, and connotes the process by which cells originally identical in structure undergo progressive modification and diversification to give rise eventually to totally different types. Normal differentiation of a tissue requires that the participating cells receive appropriate and adequate stimuli at the proper time, such stimuli, or evocators, being chemical substances elaborated by "organizers". The organizers concerned are subsidiary to the primary organizer, that potent constituent of the dorsal lip of the blastopore, believed to be a steroid, which initiates differentiation by inducing axiation and the determination of ectoderm to form neural plate; in the absence of the primary organizer development cannot proceed. Investigations by experimental embryologists have shown that the conception of organizer activity can be applied at stages of development beyond that at which it first becomes manifest in the dorsal lip of the blastopore, and a succession of organizers is now believed to initiate and control many, if not all, of the processes of early histogenesis and organogenesis.

It follows from these premises that the undifferentiated and pluripotent cells of the primitive endoderm will differentiate to form the glandular tissues which distinguish the several regions of the alimentary tract only if they receive effective and suitable stimuli, and it does not seem an unduly imaginative suggestion that modified chemical processes will attend, if they have not induced, the formation of enterogenous cysts and diverticula, and that the cells of the endodermal lining of the cyst or pocket will incur stimuli which differ from those which determine the evolution of normal intestinal mucous membrane in the intestinal tube proper. Metaphorically it would seem that in the distal portion of a diverticulum particularly, the embryonic chemistry is transposed from a key in which intestinal mucous membrane is differentiated to one in which the dominant may be an evocator of gastric, pancreatic, or colonic mucous membrane. It will at least be agreed that in normogenesis, when diverticula form from the primitive gut, some subtle change takes place in the endoderm lining them, and pancreas, liver, or gall-bladder is the outcome.

Observations gathered in the study of epithelial heterotopia in the gastro-intestinal tract, as it appears in pathological states of post-natal origin, have contributed largely to the reasoning on which the generally accepted teaching regarding this facet of the subject of metaplasia in general is based. Post-natal mucosal heterotopia occurs perhaps most frequently in the stomach (Taylor, 1927), in which viscus intestinal villi appear in the mucous membrane bordering ulcerative lesions, as the result of aberrant differentiation of cells actively engaged in the reparative process. Another example of epithelial heteromorphosis intimately related to a pathological state is the appearance of gastric glands in inflamed gall-bladders, as described by Nicholson (1923). A phenomenal capacity for proliferation and downgrowth in response to chronic inflammation is exhibited by the cells of the epithelium lining the gall-bladder; as they advance into the tissue spaces and intermuscular septa loosened by the exudate of chronic cholecystitis, the multiplying epithelial cells give rise to tubular structures known alternatively as glands or tubes of Luschka, or Rokitansky-Aschoff sinuses. Nicholson (1923) observed that from the lining of the gall-bladder branched tubular mucous glands were given off, sometimes in enormous numbers. The tubular mucous glands were alien to the wall of the gall-bladder, and like the tubes of Luschka, were new formations, but they advanced the process of irregular differentiation by changing their type in a high proportion of cases, and assumed all the structural characters of gastric glands, becoming identical with those of the pylorus or those of Brunner. Nicholson recorded this metamorphosis in 17 of 24 inflamed gall-bladders in which the presence of newly formed tubular mucous glands was a feature of the histology.

A similar exhibition of bizarre differentiation of actively multiplying epithelial cells, discerningly discussed by Nicholson (1923), was that which resulted in the appearance of gastric along with intestinal glands in the regenerating mucosa spreading over the granulation tissue of a tuberculous ulcer of the colon.

The regenerative capacity of a tissue may be said to be governed by the facility with which its cells can revert to their primitive undifferentiated state, and it is generally recognized that the reversion is more likely to occur in tissues composed of less well-differentiated and organized cells. In other words, reparative processes are accomplished by the multiplication of cells which have undergone dedifferentiation, a state which involves not only a change in morphology of the cells, but a resumption of the plasticity and prospective potencies of their erstwhile embryonic condition. This is at variance with the view propagated by the school of thought which attributes repair and regeneration to activity on the part of the essentially non-differentiated cells said to persist in most if not all tissues, but, as far as one can gather, informed biological opinion discounts the existence of such undifferentiated cells in mature and well-organized tissues, holding that cells must differentiate or perish. The undifferentiated plastic cells of the embryo, and those rendered pliable by dedifferentiation, manifest their plasticity and pliability by the ease with which they are deflected from their natural lines of differentiation by unusual or abnormal stimuli.

The common denominator in all instances of epithelial heterotopia of origin traceable to pathological processes of postnatal life is chronic inflammation; it is seen operating in the intestinal metamorphosis described in the gastric mucosa in the vicinity of chronic ulcers by Taylor (1927); in Nicholson's (1923) observation of branched tubular mucous glands, and arising by metaplasia from them, gastric glands in the walls of inflamed gall-bladders; in the same author's demonstration of gastric glands in a tuberculous ulcer of the colon. In a study of *cholecystitis glandularis*, King (1934) described mucous glands, gastroduodenal glands, and in rare instances pancreatic glandular tissue, as products of metaplasia affecting the epithelium of the Rokitansky-Luschka-Aschoff sinuses. the gastric glands so deriving as described by Nicholson (1923) and by King (1934) were of pyloric or duodenal

type; but it is interesting to note the report by McKibben and Hall (1954) of the presence of fundal, acid-producing and pepsin-producing gastric glands in the wall of a gall-bladder exhibiting chronic cholecystitis and cholelithiasis.

Instigated thereto by chronic inflammation epithelial cells proliferate, and the more active their multiplication, the greater their tendency to dedifferentiation, from which state they may emerge in the fullness of time as units in structures normal or indigenous to the part, or constituents of tissues of related character, but proper to another and more or less distant situation. Should the cells in question incur no unnatural stimuli their redifferentiation will be in a normal direction; but in the changed environment of the chronic inflammatory state they may be subjected to erratic stimuli which, forcing them to suppress a particular potency and develop another, act as evocators of strange bedfellows for normally differentiated tissues.

The "congenital" or developmental heterotopias linked with enterogenous cysts and diverticula fall into line with those that are "acquired" as a result of pathological processes of post-uterine life. There is good reason to believe that the principles of teratology do not differ essentially from those of the pathology of post-natal life, and everyday pathological phenomena may be expected to occur in the fœtus. Further, there can be little doubt that endodermal cells in the recess created by a diverticulum are affected by stimuli which differ from those that ensure normal differentiation and develpoment for the endoderm of the intestinal tube proper. Both ante-natal and post-natal heterotopias embody the reactions of cells in a plastic state to stimuli deriving from an abnormal environment.

It must be allowed that post-natal or accidental heterotopic tissues seldom exhibit that perfection of design and finish which distinguishes those of ante-natal development, remarkable in that the only abnormality they display is that of location. The lack of artistry in a tissue fashioned by the abnormal stimulation of reparative cells incidental to the chronic inflammatory state in adulthood contrasts with the flawless structure of heterotopic tissues as they are found in infants and children. The explanation of the structural imperfection frequently to be noted in post-natal or acquired heterotopia would seem to lie in the fact that in most instances such anomalies are of relatively recent date and are observed in process of formation; such of their cells as are incompletely differentiated participate in imperfect and atypical histological patterns, but the morphology of their most highly differentiated cells and structural units is entirely typical and normal.

Summary.

1. Fourteen pathological specimens, of which two are examples of jejunal diverticula, two of enterogenous cysts, and ten of Meckel's diverticula, have been selected for review as illustrating the association of alimentary glandular heterotopia with enterogenous cysts and diverticula.

2. Meckel's diverticula, as representing arrest of normal development, are considered apart from other congenital intestinal diverticula which, with the closely related enterogenous cysts, embody the results of abnormal development.

3. The nature of the deviation from normogenesis involved in the development of enterogenous cysts and congenital intestinal diverticula other than those of Meckel is considered, and the suggestion is advanced that the persistence of one or more of the vacuoles or diverticula of the small intestine of the embryo, described as of common occurrence in the widely quoted work of Keibel (1905) and of Lewis and Thyng (1908), does not provide a wholly satisfactory solution of the problem of the origin of enterogenous cysts and diverticula.

4. Gastric mucosa of fundal character predominated as the ectopic tissue to the extent that it was present in 12 of the 14 specimens described; of the remaining two, one exhibited pancreatic tissue in the wall of a Meckel's diverticulum, and the other, an ileo-caecal cyst, an atrophic and anomalous mucosal lining, suggestive but not conclusive of the pyloric type of gastric mucosa.

5. The clinical emergencies directly referable to the presence of heterotopic glandular tissue in the enterogenous cysts and diverticula described may be tabulated as follows: (*a*) Intestinal hæmorrhage, due to demonstrable "peptic" ulceration in each of two jejunal diverticula (Specimens I and II), and in five Meckel's diverticula (Specimens V to IX); in a sixth diverticulum of Meckel gastric mucosa was abundant, and though hæmorrhage was profuse, no ulcer could be found within the diverticulum, or in the mucosa of the resected portion of bowel (Specimen X). (*b*) Ileo-colic intussusception provoked (i) by the presence of an ileo-caecal cyst (Specimen IV) and (ii) by invagination of a Meckel's diverticulum harbouring ectopic gastric mucosa in its apical portion (Specimen XII). (*c*) An abdominal crisis simulating acute appendicitis, the pathological basis for which was an acute suppurative process supervening on perforation of an enterogenous cyst lined throughout by gastric mucous membrane (Specimen III).

6. Heterotopic glandular tissue appeared not to participate in (i) intestinal obstruction due to strangulation of a loop of bowel by a fibrous band attaching the gastric mucosa-lined apex of a Meckel's diverticulum to the umbilicus (Specimen XI), or in (ii) acute diverticulitis affecting a diverticulum of Meckel containing pancreatic tissue in the muscular wall (Specimen XIV).

7. In one instance a rich deposit of gastric mucous membrane in a Meckel's diverticulum gave no clinical indication of its presence (Specimen XIII).

8. Discussion relating to the incidence of epithelial heterotopia in the alimentary tract and the pathogenesis of its clinical manifestations is included in the appropriate section.

9. Though heterotopia of clinical significance is closely linked with intestinal diverticula, the reports of Taylor (1927) and of Ramsay (1954) show convincingly that the presence of a diverticulum is not an inflexible precedent for the occurrence of clinically obtrusive gastric tissue in the small intestine.

10. In a discussion of the histogenesis of glandular misplacements in the alimentary tract it is represented that the theory which invokes displacement of cells predetermined as precursors of gastric mucous membrane, and their reimplantation at abnormal sites, is speculative and untenable. Heterotopic tissues of both ante-natal and post-natal development are to be regarded as expressions of the reactions of indigenous cells in a plastic state to stimuli deriving from an abnormal environment.

Acknowledgements.

I am much indebted to Dr. Alan Williams, who at the outset of this study kindly placed his file of "Kodachrome" projections and pathological sections at my disposal, and as the work proceeded diverted to me all specimens of promise for my purpose. To the photographic unit of the Royal Children's Hospital, directed by Mr. C. Murphy, I am obliged for ever-ready assistance in the production of the illustrations.

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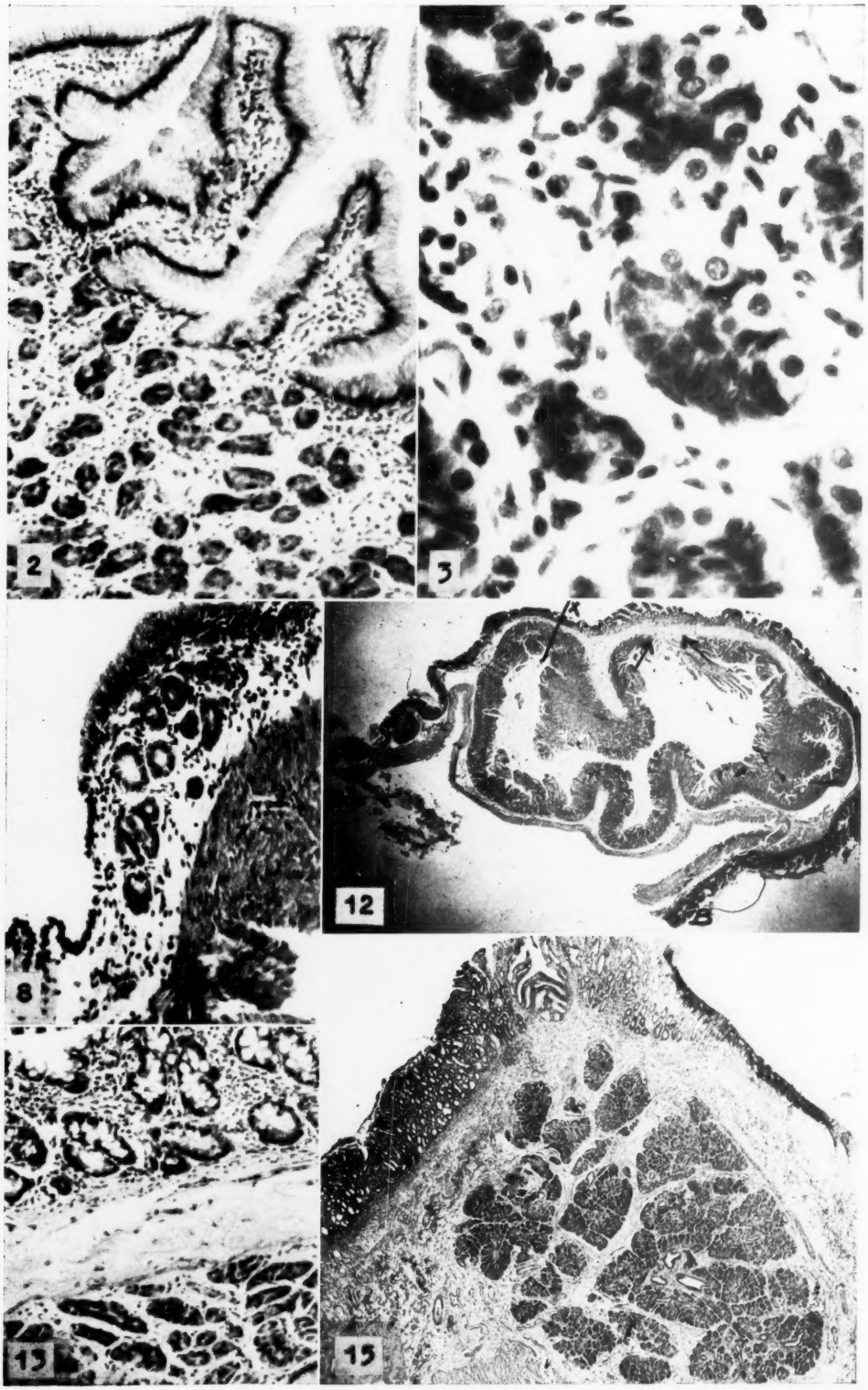

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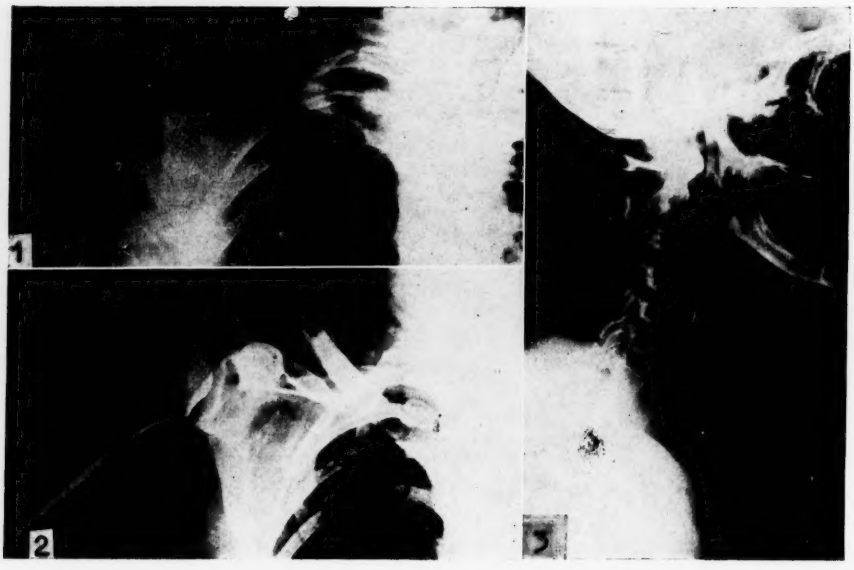

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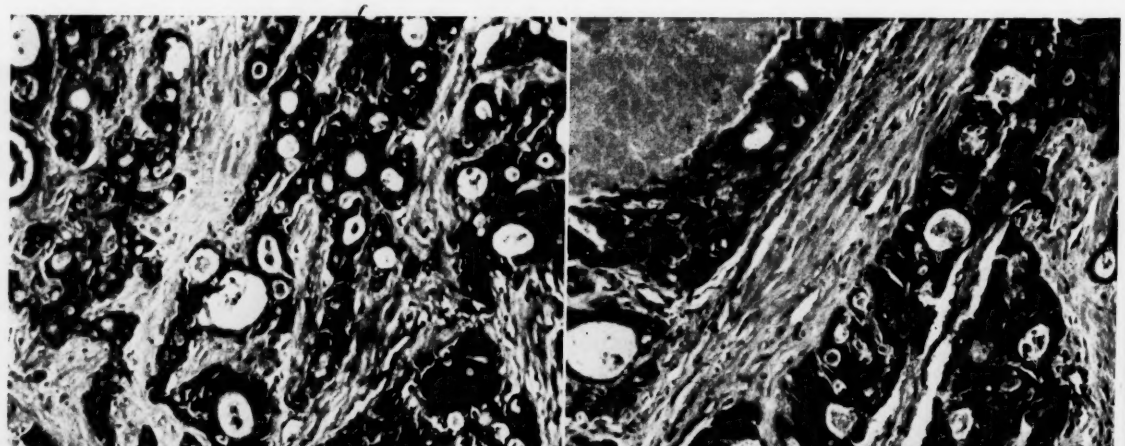

FIGURE II.

FIGURE VI.

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Legends to Illustrations.

FIGURE II.—Photomicrograph of mucosa of Specimen I: Figure I. Fundal type of gastric mucous membrane.

FIGURE III.—Detail of Figure II. Conspicuous oxyntic cells.

FIGURE VIII.—Specimen IV. Remnant of mucosal lining of ileo-caecal cyst: suggestive of pyloric type of gastric mucous membrane.

FIGURE XII.—Specimen X. Cross section in low magnification; the entire mucous membrane, except the portion between the arrows, is of gastric fundal type. See text.

FIGURE XIII.—Specimen X. Photomicrograph of section taken from point marked X in Figure XII. Intestinal (upper) and gastric (lower) mucosæ in juxtaposition.

FIGURE XV.—Specimen XIV. Meckel's diverticulum: Photomicrograph of pancreatic tissue in muscular wall.

TOTAL ADRENALECTOMY AND OOPHORECTOMY FOR CARCINOMA OF THE BREAST.

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TOTAL adrenalectomy and oophorectomy is a treatment which can be offered to patients suffering from carcinoma of the breast with metastases. It will offer them relief of pain and will give them a 40% chance of arresting the spread of disease for a period of months or years. Most of these patients will have had other forms of treatment including radical mastectomy, irradiation and hormone therapy, and will not have responded. I have performed the operation in 30 cases within the last two years and wish to record my results, the improvement in management learnt by experience, and my impressions of its value.

Rationale.

Certain carcinomata are hormone-dependent, and their growth is activated by the presence of that hormone in the body; among these are carcinomata of the breast and of the prostate. As early as 1896, Beatson stated that after oophorectomy in advanced carcinoma of the breast the spread of metastases was slowed or inhibited.

Huggins and Dao (1953) published a series of 30 cases in which removal of the adrenals, which secrete œstrogenic substances, resulted in a considerable subjective and objective improvement in 40% of cases of carcinoma of the breast with established metastases. Later, Huggins (1954) found that oophorectomy was also necessary to eliminate œstrogenic hormones from the body. It has been proved by estimation of excretion of œstrin in urine that even senile ovaries may become activated after adrenalectomy.

Selection of Patients.

All patients with established metastases, whether osseous, dermal, pulmonary or cerebral, should be offered the chance of alleviation of their disease. I know of no means of estimating pre-operatively which patients will respond favourably and which will be unimproved. Huggins states that in his series only adenocarcinoma responded to adrenalectomy; but Sir Stanford Cade in his successful cases included all histological types of breast carcinoma.

Prognosis after Operation.

Post-operatively a favourable response is demonstrated within the first few weeks, relief from pain is dramatic and early, the state of nutrition improves immediately, and radiological evidence of regression of metastases is well established at three months.

In some cases recalcification of osteolytic lesions is almost complete; in others partial recalcification occurs, or existing lesions appear unimproved radiologically but do not progress as rapidly as hitherto. In my experience, in 90% of patients subjective improvement occurs, as demonstrated by improved nutrition, more cheerful mental outlook and ability to care for their own needs and those of their family; this is maintained until within a few days or weeks of death. Death does not occur by a slow process of attrition and cachexia, it is usually sudden and caused by acute irreversible adrenal failure, when replacement cortisone therapy loses its effect.

One might postulate that any improvement which occurred could be obtained by the use of cortisone therapy without adrenalectomy. In 1953, S. G. Taylor reported that in 11 cases in which cortisone therapy was given without adrenalectomy, no palliation equivalent to that afforded by adrenalectomy was obtained.

Causes of Failure.

The causes of failure are not clear at present, but the following two explanations may be considered.

First, L. S. Graham (1953) has found accessory adrenal cortical tissue in the region of the cœliac plexus in 32 of 100 consecutive autopsies at the Memorial Hospital, New York. These accessory glands averaged seven by four by three millimetres in size and had similar histological features to those of the adrenal cortex.

Second, certain mammary carcinomata appear to be uninfluenced by the removal of ovarian and adrenal hormones. The histological type does not seem to be the determining factor; but it is possible that hormone from the pituitary gland may exert a favourable influence upon the metabolism of the carcinomatous cells.

Pre-operative Treatment.

If the patient is in a state of poor nutrition or is vomiting, admission to hospital for one or two weeks is desirable. A vitamin-rich diet combined with cortisone therapy, 50 to 75 milligrammes per day, will improve the patient's general condition. Otherwise admission to hospital forty-eight hours prior to operation is sufficient. A full blood count and blood typing, and estimation of the blood urea content,

the erythrocyte sedimentation rate, the serum calcium content and the serum alkaline phosphatase content should be carried out. A very strict pre-operative regime of cortisone therapy is instituted for twenty-four hours before operation. Approximately 300 to 350 milligrammes of cortisone are given in this period, high doses are continued for forty-eight hours after operation, and then the dosage is reduced gradually until by the tenth post-operative day the patient is on a permanent maintenance dose of 37·5 to 50 milligrammes of cortisone per day.

Operative Technique.

I have learnt by experience that the operation of bilateral adrenalectomy in one stage is a dangerous procedure. No patient should be subjected to this risk unless she has refused to accept the operation in two stages. The first stage consists of bilateral oophorectomy and usually left adrenalectomy. Seven to fourteen days later, according to progress, the other adrenal is removed. Full cortisone therapy is given in the twenty-four hours preceding each operation. An intravenous drip administration of saline is commenced in the operating theatre; this is usually changed to blood before the conclusion of the operation. A high renal incision is employed. I do not now resect the twelfth rib except in cases of exceptionally difficult access. I use Cushing clips and diathermy for hæmostasis. As the adrenal vein is about to be ligated the anæsthetist gives 50 milligrammes of cortisone.

If the blood pressure falls and remains below 110 millimetres of mercury, systolic, and 75 millimetres, diastolic, "Methedrine" is given or extra cortisone (50 milligrammes). If the twelfth rib is intact there is no danger of perforating the pleura, and convalescence is smooth and rapid; the patient is out of bed on the second day and walking about on the fourth or fifth day. Using these operative techniques and with skilful anæsthesia, I have had only one immediate post-operative death. At autopsy this was found to be due to the perforation, probably during the induction of anæsthesia, of a long-established peptic ulcer, the floor of which was composed of peritoneum only. The presence of this was unsuspected. We have not had to use noradrenaline in any case. With the two-stage procedure convalescence is uneventful; a rise in temperature and pulse rate occurs in the first three days and resembles that of a mild post-thyroidectomy crisis.

Summaries of Cases.

I have summarized 13 cases which showed features of interest.

CASE I.—My first case, which was reported in this journal on February 13, 1954, was complicated by thyrotoxicosis, which had to be controlled before the patient, Mrs. X., was subjected to operation. Her pelvis recalcified and she remained well for fourteen months after operation. She then developed multiple skeletal metastases of a different type, sclerosing and not osteolytic, and died very suddenly seventeen months after operation, supposedly of adrenal failure. At autopsy there were three small secondary deposits one centimetre in diameter in her liver. Professor F. R. Magarey's report on her bones is appended; this shows that in places calcification was pronounced and in other situations the carcinoma was extending.

> The body was in a state of very good nutrition. The thyroid, pituitary, heart, pancreas and kidneys were normal.
>
> Lungs, a few small metastatic tumour deposits.
>
> Liver, three small metastatic nodes 1 cm. in diameter.
>
> Clavicle, there is a good deal of new bone formation in association with a metastasis of spheroidal cell carcinoma. The latter is distributed in the interstices of the cancellous bone and consists in the main of small groups of cells.
>
> Femur, here the tumour for the most part is a typical scirrhous carcinoma. In some areas the interstitial tissue has undergone an osteoid change and there is evidence of active bone absorption.
>
> Acetabulum. As for femur.
>
> Rib, osteoid tissue and new bone formation is rather more obvious here than in the femur, but ossification is by no means as advanced as in the clavicle.

CASE II.—B., aged fifty-three years, was operated on in December, 1953. Her sixth cervical vertebra recalcified, her lumbar vertebræ became more calcified, but the lesion in her sacrum continued to advance until the time of her death. She died fifteen months after operation, apparently of acute adrenal insufficiency induced by forty-eight hours of vomiting; but up to within one week of her death she was ambulant and able to care for her own simple needs; she also said that she felt very well. Her nutritional state was good, and to outward appearance she was very well.

CASE V.—C., aged sixty-seven years, after a radical mastectomy in June, 1952, developed multiple skin nodules in her scar. These were excised and a skin graft was applied in July, 1953. By October she had multiple skin nodules round the edge of the graft and her third lumbar vertebra was involved. After adrenalectomy and oophorectomy her skin metastases disappeared and her lumbar vertebra showed calcification; but in 1955 she developed left-sided obturator pain extending down to the left knee. In March, 1955, Dr. Denis Rowe performed a chip bone grafting operation to the lumbar part of her spine, and up to date she is very well and free from pain. She is ambulant on crutches.

CASE VI.—D., aged thirty-four years, underwent oophorectomy and hysterectomy in May, 1953, followed by a simple mastectomy for what was thought to be hormonal mastopathy. Biopsy of the breast revealed that she had developed a carcinoma in one area of hormonal mastopathy, and a radical mastectomy was performed one month later. The metastases consisted of involvement of two axillary nodes, but her skeleton was not involved. In view of her age of thirty-four years, I considered that her prognosis was extremely poor. She consented to undergo a total adrenalectomy before she developed any distant metastases. This patient was operated on in March, 1954, and in June, 1955, she is well and in a good state of nutrition and has no demonstrable metastases. This patient has had difficulty with her cortisone replacement therapy; she developed pain in her epigastrium, and a gastroscopic examination revealed that she had atrophic gastric mucous membrane with two small ulcers on the lesser curvature. Under treatment by diet and "Amphojel" this patient is quite comfortable again.

CASE VII.—E. had a large primary tumour in the lower inner quadrant of the left breast; skin involvement extended to the right breast and large, fixed axillary glands were present. She was considered inoperable; she had been given œstrogen therapy for one month, but the disease was advancing. She underwent bilateral adrenalectomy and oophorectomy in February, 1954. Reduction of the tumour occurred, skin involvement diminished, and in February, 1955, we were able to perform a left simple mastectomy. She is alive and well in June, 1955.

CASE VIII.—F., aged fifty-two years, underwent a right radical mastectomy in November, 1953; at that time her skeleton was clear. Two months later she had multiple skeletal metastases. In February, 1954, she underwent bilateral oophorectomy, and in April, 1954, total adrenalectomy. During her stay in hospital her second lumbar vertebra collapsed. She obtained a very satisfactory remission, and in June, 1955, is in excellent health; she does all her own housework, including washing and gardening, and has recently returned from a hiking holiday with her husband.

CASE X.—G., aged forty-one years, underwent a radical mastectomy in 1952 with irradiation of her ovaries. In 1954 she had multiple skeletal metastases with collapse of the twelfth thoracic vertebra. This patient is alive in June, 1955, and her skeletal metastases are stationary. No further extension has occurred in the last six months; she is well and free from pain, but unable to get about except in a minimal manner.

In the remaining three cases listed the operations have been performed within the last six months; but the patients' improvement has been so dramatic that I feel that they should be included in this report.

CASE XI.—Mrs. H., aged forty-seven years, underwent a radical mastectomy in 1944 at the age of thirty-seven years; three years later she had her seventh child. In 1953 she was investigated in the Neurological Clinic at the Royal North Shore Hospital for severe headaches, slurred speech and inability to concentrate. Halfway through a sentence she would forget what she had started to say and be unable to complete the remark. A diagnosis of metastasis in the left temporal lobe of the brain was made. She underwent oophorectomy and total adrenalectomy in December, 1954, and in March, 1955, she felt remarkably well and her speech was quite fluent. In June, 1955, her local medical attendant informed me that she was very well and was doing all her

TABLE I.

Results of Bilateral Adrenalectomy in 13 Cases.

Case Number.	Age. (Years.)	Date of Operation.	Previous Treatment.	Metastases.	Remission.	Remarks.
I	43	July 15, 1953.	Radical mastectomy, 1949; post-operative irradiation; "Testoviron", Jule, 1952, till April, 1953.	75% of pelvis, fourth lumbar vertebra, right clavicle.	+++	Pelvis recalcified, fourth lumbar vertebra healed, clavicle healed; hot flushes; died 17 months after operation.
II	53	December, 1953.	Radical mastectomy, 1948.	Sixth cervical vertebra, twelfth thoracic vertebra, first and second lumbar vertebræ, sacrum.	+	Sixth cervical vertebra recalcifying; twelfth thoracic vertebra, extension; first and second lumbar vertebræ, heavier calcium; sacrum stationary; died 15 months later of acute adrenal insufficiency.
III	68	December, 1953.	None: fulminating carcinoma of the right breast, inoperable.	Liver, right adrenal.	—	Died four weeks after operation; contributing cause, too little cortisone therapy.
IV	41	January, 1954.	Radical mastectomy; "Testoviron", 1952–1954.	Second and fourth lumbar vertebræ; pathological fracture of left femur.	—	Died 18 hours after operation from perforation of chronic peptic ulcer; ? occurred 15 minutes after induction of anæsthesia.
V	67	February 11, 1954.	Radical mastectomy, June, 1952; excision of skin nodules and skin graft, July, 1953.	October, 1953, multiple skin nodules *round graft; third* lumbar vertebræ.	+++	Skin metastases disappeared; more calcification in third lumbar vertebra; bone graft to lumbar part of spine, March, 1955; well to date.
VI	34	March, 1954.	Oophorectomy and hysterectomy, May, 1953; simple mastectomy, 1953; radical mastectomy, June, 1953.	None demonstrated except involvement of two axillary nodes.	—	"Prophylactic" total adrenalectomy; very well June, 1955, and no metastases.
VII	67	February, 1954.	Œstrogen, one month; disease advancing.	Large primary tumour lower inner quadrant left breast; skin involvement; extension to right breast; considered inoperable; axillary glands affected.	+++ Clinical reduction of tumour and skin involvement.	Experimental, to determine if primary tumour would subside. June 1, primary tumour much smaller. Small biopsy taken three weeks after adrenalectomy. Alive and well, June, 1955.
VIII	52	April, 1954.	Right radical mastectomy, November, 1953; bilateral oophorectomy, February, 1954; biopsy of hormonal mastopathy left breast, February, 1954.	Second lumbar vertebra, sacrum, pubic symphysis, right femur (radiologically confirmed, January, 1954).	+++ Subjective and objective.	Sacral metastases *decreasing*; second lumbar vertebra collapsed, but denser; other *metastases in statu quo*; in excellent health, June, 1955.
IX	43	April, 1954.	Radical mastectomy, 1949; oophorectomy, 1954.	Skin metastases, upper end of scar; œdema of arm; fourth rib; both adrenals.	Subjective, +, until three weeks before death.	Skin metastases unaffected (deep X-ray therapy); general condition fair; died March, 1955.
X	41	August, 1954.	Radical mastectomy, 1952; irradiation of ovaries, 1952.	Multiple skeletal metastases; twelfth thoracic vertebra collapsed.	Skeletal metastases stationary; well, pain-free.	Alive, June, 1955.
XI	47	December, 1954.	Radical mastectomy, 1944; cerebral metastases, two years; slurred speech and lack of concentration.	Left temporal lobe of brain.	++	Speech fluent, concentration improved.
XXIII	64	February, 1955.	Simple mastectomy, 1954; irradiation, 1954; testosterone.	Skin of chest; œdema left arm +++; bilateral pulmonary metastases.	+	Skin improved, arm unimproved, pulmonary metastases greatly decreased.
XXIX	52	April, 1955.	Radical mastectomy, 1953; irradiation, 1953.	Osseous metastases; seventh and twelfth thoracic vertebræ; bedridden five months; pain +++; liver.	Great subjective improvement.	Pain-free; up and about four weeks after operation.

housework, and that her headaches were very much improved and her concentration was normal.

CASE XXIII.—Mrs. I., aged sixty-four years, underwent a simple mastectomy in 1954, followed by irradiation and testosterone therapy. She had multiple metastases in the skin of her chest both back and front, œdema of the left arm and bilateral pulmonary metastases. This was undoubtedly the worst case in my series in which oophorectomy and adrenalectomy was attempted. The patient survived the operation; three months later the skin metastases had decreased, her arm was unimproved, and the pulmonary metastases had shown considerable reduction (to about one-third of their previous size).

CASE XXIX.—J., aged fifty-two years, underwent a radical mastectomy in 1953 followed by irradiation. She had osseous metastases with collapse of the seventh and twelfth thoracic vertebræ, and she had been bedridden for five months and was unable to sit up on account of the pain in her back. At operation it was found that she had extensive liver metastases; but in spite of that she showed great subjective improvement. She is completely free from pain and was up and about four weeks after operation.

Comparison with Other Methods of Hormonal Therapy.

Œstrogen should not be given to patients unless they are more than three years past the menopause. Many patients with inoperable carcinoma in this older group, with or without established metastases, do very well on high doses of œstrogen; 300 milligrammes of stilbœstrol or its equivalent are given daily for six to eight weeks, clinical improvement occurs, existing ulceration heals and the primary tumour is reduced in size. A daily maintenance dose of 30 milligrammes of stilbœstrol is then instituted. Patients develop euphoria, and side effects are easily dealt with. These include bladder irritability, uterine bleeding (which, unless it is excessive, is ignored), and occasionally prolapsus uteri from softening of the ligaments

of the pelvic floor. I have patients whose condition was inoperable three to five years previously who are alive and well on this treatment.

Testosterone will cause recalcification of osseous lesions and improvement for seven to twelve months, after which, in my experience, the disease becomes reactivated and regression takes place at a very rapid rate. The side effects of this hormone on the female are dreadful and out of all proportion to the temporary benefit obtained. Hirsutism is pronounced, libido is increased, hoarseness of voice occurs and a considerable change in temperament develops. The patient becomes aggressive and argumentative. If she is going to die ultimately, I am of the opinion that it is better to leave her with her feminine characteristics. I have entirely abandoned the use of this hormone.

Summary and Conclusions.

1. Total adrenalectomy and oophorectomy offers the patient with established metastases, on whom all other methods of treatment have failed, a 50% chance of objective reduction in established metastases and a 90% chance of improvement in health and nutrition for the remainder of life. In my opinion it is the treatment of choice for pre-menopausal women.

2. No long-term prognosis can be postulated at this stage. The treatment has been practised only since 1951.

3. The operation of bilateral adrenalectomy in one stage is dangerous. A two-stage operation with an interval of seven to fourteen days carries a minimal risk.

4. A careful regime of pre-operative and post-operative cortisone therapy must be instituted and carried out in a meticulous manner. Desoxycortisone acetate (100 milligrammes) is implanted into the tissues of the wound at one of the operations. Skilful anæsthesia is essential.

5. Relief from pain is early and dramatic; the reason for this is unknown. If improvement is going to occur, it is evident within a few weeks of operation.

6. Replacement therapy is maintained by 37·5 to 50 milligrammes of cortisone given daily by mouth.

7. Sir Stanford Cade, in a Hunterian lecture in June, 1954, makes the following statement:

> *Bilateral adrenalectomy is an encouragement* in the pursuit of an ideal which is to control cancer by an attack on the medium in which it grows as well as by a direct attack on the tumour.
>
> Adrenalectomy seems to be a fundamental advance in the conception that both the cause and the remedy of cancer in certain sites lie within us, within the physiological or normal processes which effect the maintenance of normal nutrition, the biological function of cell division and hence life itself.
>
> It is pleasing to reflect that this latest battle in the unrelenting struggle against this greatest of mankind's foes should have been a combined effort of many talents and varied skills guided by the dictum of our immortal Hunter: "Try the experiment."

Acknowledgements.

I wish to place on record my thanks to the following colleagues who have assisted me in this fascinating work. My thanks are especially due to my anæsthetists, Dr. Gwenifer Bernard, Dr. Una Blacker and Dr. Marie Hill, for their skilful administration of very difficult anæsthetics; to my assistant surgeons, Dr. A. W. Middleton and Dr. R. S. Hudson; to Dr. Marjorie Dalgarno, radiologist of the Rachel Forster Hospital; to the resident and nursing staff of the Rachel Forster Hospital for their devoted care and handling of patients in the post-operative period; to Dr. Colin Edwards, of the Rachel Forster Hospital staff, for acquainting me originally with the theory of adrenalectomy; to Dr. Charles Huggins, of Chicago, for personal communications and advice; to Dr. R. G. Malcolm, Dr. Kevin Coen, Dr. John Mullany, Dr. John Morris and the staff of the Rachel Forster Hospital for referring patients to me. To Professor F. R. Magarey, of the University of Sydney, and Dr. J. M. Drury-White for histopathological reports; and last but not least, to Dr. L. R. Broster, of Charing Cross Hospital, London, the British pioneer in the field of adrenal surgery, who first aroused my interest in this branch of surgery and who has continued to offer helpful advice over the past four years.

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Legends to Illustrations.

FIGURE I.—Case I: Recalcification of right clavicle three months after adrenalectomy.

FIGURE II.—Case II: Destruction of acromial end of right clavicle.

FIGURE III.—Case II: Recalcification in sixth cervical vertebra.

Reports of Cases.

ELECTIVE REEXPLORATION FOR THE MANAGEMENT OF METASTASES: A CASE OF APPARENT CURE OF OVARIAN CARCINOMA WITH METASTASES.

By EDWARD WILSON, M.D., M.S., M.Sc., M.R.A.C.P., F.R.C.S. (England), F.R.C.S. (Edinburgh), F.R.A.C.S., F.A.C.S.,
Sydney.

At present it is the usual custom after a "radical" removal of an intraabdominal malignant growth to await irrefutable evidence of metastases before embarking on further treatment. Such a delay must mean that the long-term results of present-day treatment of these cancers are complacently accepted, or that further treatment is impracticable. The paucity of attempts to deal with the problem certainly suggests this.

When I was faced with a patient who had had a carcinoma of the ovary removed and who had subsequently developed a localized metastatic mass which might have caused her death, it seemed good cancer surgery to reexplore her abdomen before any large metastases

reappeared. At first it was wondered why elective re-exploration had not been performed previously; but a search of the literature showed that, as with most supposedly original ideas, this had already been proposed.

In 1949 Wangensteen suggested what has been called the "second look" procedure; and, two years later, he and Lewis published results in favour of reentry of the abdomen in cases of carcinoma of the colon in which lymph nodes were involved, reexploration being performed within a few months of the initial operation and in the absence of signs and symptoms. However, these authors advised against reexploration in cases of carcinoma of the colon in which the excised lymph nodes were free of metastases; and, although final conclusions as to the value of reexploration in cases of malignant disease arising in sites other than the colon were not reached, these workers considered it unlikely to be of great value in such cases.

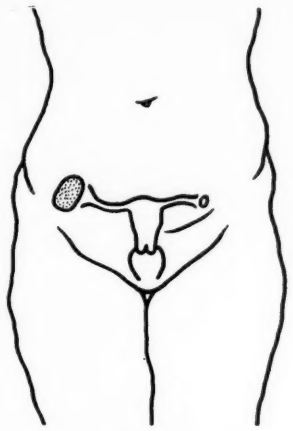

FIGURE I.
October 11, 1950: Right salpingo-oophorectomy for carcinoma of the right ovary.

The various objections which have been raised to this somewhat unorthodox suggestion, such as the financial strain on the patient, unwarranted curiosity on the part of the surgeon, and lack of knowledge of the pathology of cancer have been enumerated by Fisher (1954) and may be refuted. The suggestion that a properly performed first operation does not require a "second look" can come only from those surgeons who do not follow up their cancer patients, and requires no further comment. The economic problem of repeated operations admittedly exists, but will be balanced by the patient against what could be the only chance of cure. In practice, any objection to reexploration does not come from the patient. If the patient is aware of the fact that a cancer has been removed, he or she is unlikely to be faint-hearted about further operation or to raise objections to reexploration and to an increased chance of cure. On the other hand, if the surgeon himself is faint-hearted or is too busy theorizing about the disadvantage of reexploration, at least an occasional patient will be lost who would otherwise be salvaged. The need for aggressiveness in the treatment of cancer is well shown by the case reported below and by a somewhat similar case described by Wangensteen, Lewis and Tongen (1951). In the latter case a carcinoma of the caecum was resected and then elective reexploration was performed on five occasions after the initial operation. Metastases were found and removed on the first four, but finally none was found.

The possibility of cure is of greater importance to the patient than the period of unemployment, the stay in hospital, or even the pain or discomfort associated with another operation. In some, but not all, cases of cancer the progression of metastases is slow; yet in all cases there is no doubt that the result of excision of metastases will be better if they are removed whilst they are still unobtrusive rather than if excision is delayed until they are painfully obvious. In other words, the treatment of metastases, to be effective, necessitates early recognition and early operation. Even then aggressive measures will be required. If such recognition is delayed till a late stage, then certainly no more than palliation will be possible.

However, if there are distant metastases or evidence of extensive lymph-node involvement, it is most unlikely that any benefit will accrue from a further exploration. Reexploration is also not recommended for cancers which are notorious for their venous spread, such as renal carcinomata, or for certain cancers whose metastases usually respond favourably to irradiation, such as seminomata. It is also not recommended if many years of apparent freedom from metastases have elapsed. Thus, reexploration is not being advised for all and sundry. Rather it is considered that it should be reserved for those cases in which the metastases, if any, appeared to be limited to the region of the primary growth at the time of the first operation. Whether or not reexploration should be further limited to cases of carcinoma of the colon is still open to doubt, since it would seem that in any case of intra-abdominal malignant disease which has already required a second operation for the treatment of apparently localized metastases, as in the case reported here, subsequent reexploration is undoubtedly justified if all the detectable malignant spread has been removed at this second operation.

FIGURE III.
February 2, 1951: Left salpingo-oophorectomy for carcinoma of the left ovary, excision of the upper half of the rectum and total hysterectomy for metastatic involvement, excision of metastasis from vaginal wall, and excision of plaque of granulation tissue from side wall of the pelvis.

Improvement in the results of the treatment of cancer must follow the discovery and ablation of metastases at an earlier stage than is possible if reliance is placed solely on clinical examination. It is therefore pertinent to ask whether the risk of elective reexploration is now less than the risk of leaving metastases until they are detectable clinically. If the answer to this question is yes, it is also pertinent to ask whether we are being negligent in our attack on cancer in not performing elective reexplorations more often.

In the case reported below, an ovarian carcinoma gave rise to indisputable metastases. Nevertheless, the result has proved the value to the patient of repeated elective

reexplorations. This unmarried woman was aged twenty-two years at the time of the first operation of oophorectomy on October 11, 1950. The dates of the subsequent operations were as follows: February 2 and July 5, 1951; January 31 and October 8, 1952; January 13 and April 28, 1953; and February 16, 1954. The operations on February 2, 1951, and October 8, 1952, were performed primarily because of intestinal obstruction. The operations on July 5, 1951, March 31, 1952, January 13, 1953, April 28, 1953, and February 16, 1954, were elective reexplorations. Up till October 8, 1952, metastases were discovered and were removed, but none was found at the next three operations. That is, metastases were discovered during the two operations for intestinal obstruction and during the first two elective reexplorations. As there was no clear basis for deciding the lengths of the intervals between the elective explorations or when to cease from performing further laparotomies, these decisions were, of necessity, empirical.

The possibility of spontaneous cure in such a case must be acknowledged, destruction of the metastases resulting from inadequacy of the blood supply or other host reaction. In addition, there is the possibility that the cure is only apparent and that there are latent foci containing dormant emboli of malignant cells such as Schmidt (1903) demonstrated in lungs devoid of visible metastases. According to Willis (1948), such abortive tumour embolisms also occur in other tissue and account for many of the peculiarities of distribution of metastases. Further, the slow rate of growth of some hepatic metastases is well recognized and has been commented upon by Dukes (1949) and others; and, even though this patient has never shown any evidence of hepatic metastases, it is not impossible that they do exist in her case. However, this patient is now alive and very well, and it is incontrovertible that she has been greatly helped by the elective reexplorations.

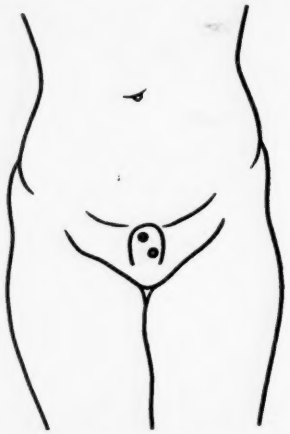

FIGURE IV.
July 5, 1951: Elective reexploration and excision of two metastases from vagina.

In my other cases of elective reexploration the periods which have elapsed since the original operations are too short to make the results significant at present. They will therefore be reported later.

Clinical Record.

Miss A. was born in 1929. In September, 1950, pains commenced to occur irregularly in the lower part of the abdomen, and examination revealed a tender mass in the right fornix. Her general condition was good. The only previous illness was appendicitis, appendicectomy having been performed in 1949. On October 11, 1950, a right salpingo-oophorectomy was performed (Figure I). The peritoneum and other intraabdominal viscera, including the left ovary, appeared normal. The pathologist's report on the excised specimen was as follows:

The specimen consisted of a multilocular partly cystic tumour approximately round and measuring 8 cm. in diameter. The linings of several of the loculi were velvety and studded with granular projections. Towards the centre there was a solid irregularly shaped nodule with a mottled yellow and grey cut surface. One uterine tube was attached.

Microscopic examination: The epithelium lining the cyst and scattered through the connective tissue of the solid parts has an irregular cribiform or multiacinar pattern, the nuclei are large and stain darkly and mitoses are numerous. There are many regions of necrosis. The appearances indicate carcinoma and suggest an origin similar to that of serous cystadenoma.

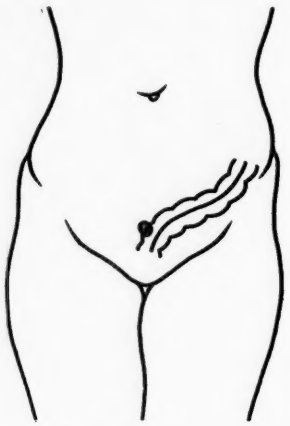

FIGURE V.
January 31, 1952: Excision of metastasis situated between rectum and side wall of the pelvis.

The microscopic appearances of the tumour are shown in Figure II.

Convalescence was uneventful. On November 13 deep X-ray therapy was commenced. Although there was some general upset during this treatment, the course was completed.

On February 2, 1951, the patient complained of constipation and vomiting of seven days' duration. A hard mass was then palpable in the recto-uterine pouch and left fornix. At operation the upper half of the rectum (which contained a hard mass), plaques on the left lateral wall of the pelvis, the enlarged left ovary, nodules in the posterior vaginal wall and the uterus were removed (Figure III). No other metastasis was seen. The ends of the bowel were brought out through the left lower oblique wound. The pathologist's report on the specimens excised was as follows:

The following specimens were received. 1. Portion of the rectum 14·0 cm. long. At the centre it was completely occluded by new growth. 2. (*a*) An enlarged cystic ovary 7·0 cm. × 5·5 cm. × 4·0 cm. Sections revealed numerous loculi, some filled with pale greenish-yellow gelatinous material, and others with yellow watery fluid. Near the hilar surface was a stretched layer of ovarian tissue continuous with some yellowish friable tissue. 2. (*b*) A small uterus with cervix attached. 3. An irregular strip of tissue 4·0 cm. long resembling scar tissue with yellowish tissue on one surface. 4. A dumb-bell shaped piece of adipose tissue with membrane on one surface 2·5 cm. long, the nodule at each end consisting of firm white tissue. Microscopic examination: 1. The rectum is invaded by growth. 2. (*a*) Sections show partially necrotic seroanaplastic carcinoma of the ovary in papillary and plexiform pattern. 2. (*b*) The uterus shows no significant change. There is active chronic cervicitis. 3. The plaque from the pelvic wall is composed of hæmorrhagic granulation tissue. 4. The

nodule from the vagina is a deposit of carcinoma of appearance similar to that of the ovary.

A month later continuity of the bowel was restored. Another course of X-ray treatment was then commenced, but was not completed because of severe nausea and malaise.

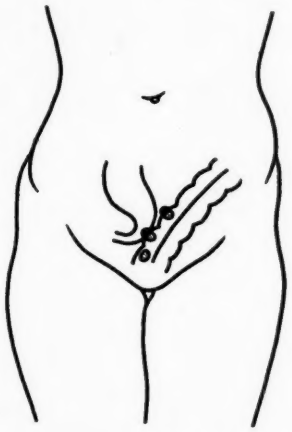

FIGURE VII.

October 8, 1952: Freeing of a loop of ileum from the rectum and removal of three metastases situated posterior to the rectum.

On July 5, 1951, the first elective laparotomy was performed through a lower mid-line wound. There had been no sign or symptom suggestive of metastases since the previous operation. At the time of this operation two nodules each about a quarter of an inch in diameter were

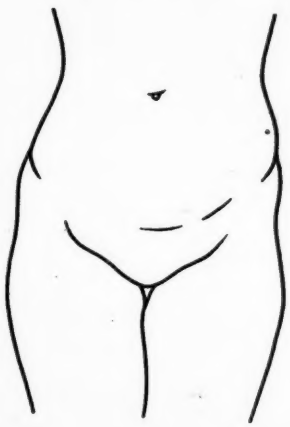

FIGURE VIII.

January 13, 1953, April 28, 1953, and February 16, 1954: Elective reexplorations, and no metastasis found.

removed from the top of the vagina (Figure IV). No other metastasis was detected. Again the post-operative course was uneventful. The pathologist's report on the excised specimens was as follows:

> Two specimens were received: 1. The larger piece measured 3·0 cm. × 2·0 cm. × 1·5 cm. One half was composed of deeply congested scar tissue orange-brown towards the centre. In the other half was a hard, slightly translucent, pale grey nodule 1·0 cm. in diameter. 2. The second specimen measured 1·2 cm. × 0·8 cm. × 0·6 cm. and was composed of two types of tissue similar to the first. Microscopic examination: There is adenocarcinoma in both specimens. The growth resembles that removed previously. The orange colour of parts of the nodules is due to numerous cells containing altered blood pigment.

On January 31, 1952, the second elective laparotomy was performed through a right lower oblique incision and a metastasis which was situated between the rectum and the pelvic wall was removed (Figure V). The pathologist's report on the excised specimen was as follows:

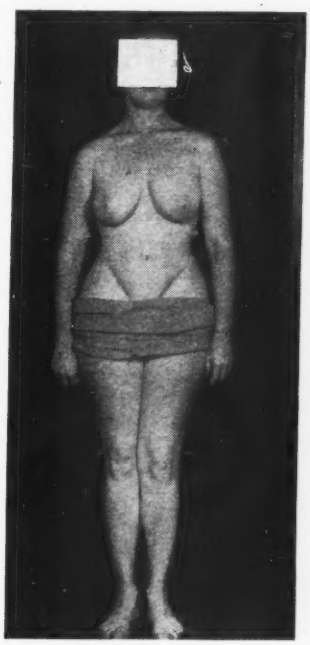

FIGURE IX.

Photograph, January 11, 1955. Since 1950 eight laparotomies have been performed, two through lower mid-line incisions, three through lower right oblique incisions, and three through lower left oblique incisions. Previously, an appendicectomy had been performed through a McBurney's incision.

> An approximately triangular piece of tissue measuring 3·0 cm. × 2·0 cm. × 1·0 cm. was received. One piece was covered by peritoneum and near one edge there was a circumscribed lesion composed of firm pale tissue and measuring 1·1 cm. × 0·9 cm. × 0·8 cm. The cut surface was divided into lobules by fine connective tissue septa. Microscopic examination (Figure VI): Sections show metastatic carcinoma. The growth resembles the primary ovarian tumour removed in 1950.

The post-operative course was again satisfactory. Since so little had been discovered at the operation on January 1, 1952, it was decided to wait nine months till the next exploration. During this time the patient remained well until a few days before the date arranged for the next elective laparotomy. Signs and symptoms of an acute obstruction of the small bowel developed, and on October 8, 1952, laparotomy was performed through a left lower oblique incision. An obstructed loop of ileum which was adherent to the side of the rectum was freed (Figure VII). At the time of this operation four nodules were removed from behind the rectum. No other metastasis was seen. The pathologist's report on these specimens was as follows:

Four irregular pieces of tissue were received, the largest measuring 2·5 cm. × 2·0 cm. × 1·5 cm. The cut surface showed alternating areas of white and yellow tissue. Microscopic examination: The three largest pieces of tissue contain metastatic carcinoma with a structure similar to that of the last biopsy specimen of January 31, 1952. The smallest specimen is a lymph node and is not involved.

No further intestinal obstruction occurred, and convalescence was uneventful. On January 13, 1953, the next elective laparotomy was performed through a right lower oblique incision, but for the first time no metastasis was found (Figure VIII).

On April 28, 1953 (Figure VIII), at the next elective laparotomy a nodule was removed from the peritoneum of the mid-line wound and two nodules were removed from the side wall of the pelvis through a left lower oblique incision. The pathologist's report on the excised specimens was as follows:

The following specimens were received: 1. A piece of tough fibrous tissue measuring 1·5 cm. × 1·2 cm. 2. Two irregular pieces of adipose tissue partly covered with peritoneum and measuring respectively 4·0 cm. and 2·0 cm. in maximum extent. Each contained a firm nodule about 0·3 cm. in diameter. Microscopic examination: Sections show suture material and aggregations of foreign body giant cells. No evidence of carcinoma has been found.

On February 16, 1954, the final elective laparotomy was performed through a right lower oblique incision, and still no evidence of metastases was found (Figure VIII). It is of interest that no intraperitoneal adhesions were present at this, the patient's ninth, transperitoneal operation.

Since then she has maintained good health and has gained in weight. All wounds are firmly healed (Figure IX), she is able to do her work as a secretary in a solicitor's office, and she is able to indulge in the same activities as before 1950.

Summary.

Elective reexploration of the abdomen for the recognition and treatment of metastases before any sign or symptom develops is discussed.

The unique story is given of a woman who is now aged twenty-six years and who suffered from ovarian carcinoma. On four occasions intraabdominal metastases were excised, but none was found at three subsequent elective reexplorations. The original oophorectomy was performed on October 11, 1950, and the last operation at which metastases were discovered was performed on October 8, 1952. Since then the patient has remained very well. The findings at these various operations are shown diagrammatically.

It is concluded that elective reexploration is justified, and indeed indicated, in at least those cases of intraabdominal cancer in which a second operation has already been necessary for the removal of apparently localized metastases.

Acknowledgements.

My thanks are due to Dr. J. R. Waddell for his assistance at these operations, to Dr. G. Bernard, Dr. B. P. F. Mooney and Dr. L. T. Shea for the anæsthetics, and to Dr. E. Hirst, Dr. L. R. Findlay-Jones and Dr. A. Palmer for the pathological reports.

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Legends to Illustrations.

FIGURE II.—Photomicrograph of solid portion of the right ovary.

FIGURE VI.—Photomicrograph of metastasis which was situated between the rectum and the pelvic wall, and which was removed on January 31, 1952.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"The Extra Pharmacopœia (Martindale): Incorporating Squire's Companion", published by direction of the Council of the Pharmaceutical Society of Great Britain; Twenty-Third Edition; Volume II; 1955. London: The Pharmaceutical Press. 7½″ × 5″, pp. 1534. Price: 57s. 6d.

Intended to be a comprehensive reference book "in which accurate and adequate information can be found quickly".

"Die Überfunktion Der Nebennieren", by Rudolf Chwalla; 1955. Vienna and Bonn: Verlag für Medizinische Wissenschaften. 9½″ × 6½″, pp. 342. Price: DM48.

The author deals with hyperadrenalism in all its aspects.

"Polycythæmia: Physiology, Diagnosis and Treatment Based on 303 Cases", by John H. Lawrence, M.D., D.Sc., F.A.C.P.; Modern Medical Monographs; 1955. New York and London: Grune and Stratton. 8½″ × 5½″, pp. 144, with 38 illustrations. Price: $5.50.

There are 209 references to this monograph.

"The Josiah Macy Junior Foundation, 1930-1955: A Review of Activities"; 1955. New York: Josiah Macy Junior Foundation. 9″ × 6″, pp. 190.

There are ten chapters with a foreword; the Articles of Incorporation are set out.

"J.A.M.A. Clinical Abstracts of Diagnosis and Treatment", published with the approval of the Board of Trustees, American Medical Association; 1955. New York and London: Intercontinental Medical Book Corporation with Grune and Stratton, Incorporated. 8½″ × 5½″, pp. 636. Price: $5.50.

The abstracts selected for inclusion are limited to diagnosis and treatment.

"Premature Infants: A Manual for Physicians", by Ethel C. Dunham, M.D.; Second Edition; 1955. New York: Paul B. Hoeber, Incorporated. 9½″ × 6″, pp. 474, with 41 illustrations. Price: $8.00.

The author states that the book has been prepared to serve as a source of information in regard to prematurity and as a guide for the general care of the premature infant.

"Genital Prolapse and Allied Conditions", by Percy Malpas, Ch.M. (Liverpool), F.R.C.S. (Eng.), F.R.C.O.G.; 1955. London: Harvey and Blythe, Limited. 9″ × 6″, pp. 200, with 37 illustrations. Price: 47s. 6d.

The author is surgeon to the Women's Hospital, Liverpool, and lecturer in clinical gynæcology at the University of Liverpool.

"The Pregnancy Toxæmias or the Encymonic Atelositeses", by G. W. Theobald, M.A., M.D. (Cambridge), F.R.C.S. (Edin.), F.I.C.S., F.R.C.O.G., M.R.C.P. (Lond.); 1955. London: Henry Kimpton. 10″ × 6″, pp. 502, with 50 illustrations. Price: 63s.

The author is honorary lecturer in obstetrics and gynæcology in the University of Leeds and was assistant master at the Rotunda Hospital, Dublin.

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All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those adopted by the Quarterly Cumulative Index Medicus. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

ANTIBIOTICS.

THE use and misuse of antibiotics is a constantly recurring subject at medical gatherings and in medical publications. This is not surprising, because antibiotics have, in very truth, revolutionized the practice of medicine. This subject may be approached from two points of view; the first is that of the bacteriologist and investigator, and the second that of the clinician. The expert who has a somewhat academic approach to the subject wishes to know what new preparations have been devised, whether they are clinically effective, and whether they produce any significant adverse effect on the individual. The clinician, as is but natural, wants to know what new medicaments are available to him and also when and how they should be used. Both the expert and the clinician have need of authoritative information on which to base their action. Our present purpose is to indicate where some reliable and recent information may be obtained and to make some comment on it. Attention is therefore drawn to two books which have recently been received for review. The first is entitled "Principles and Practice of Antibiotic Therapy".[1] Its author is Henry Welch, and it has been edited by Félix Martí-Ibáñez. The other[2] is an account of the proceedings of the second annual symposium on antibiotics, and has been edited by Welch and Martí-Ibáñez. In the first volume, Welch gives the history of the word "antibiotics". He states that the term "antibiosis" was probably first used by Vuillemin in 1889 to describe what is considered nowadays to be the "survival of the fittest" whereby a creature destroys the life of another to preserve its own. Ten years later Marshall Ward used the word antibiosis to describe microbial antagonism. It was not, however, until 1942 that Waksman proposed the use of the term "antibiotics" to define those chemical substances of microbial origin that possess antimicrobial activity. He goes on to explain that with the increasing search for new antibiotics, the term has been enlarged to include not only chemical substances of microbial origin, but those of plant and even animal tissues. We read in Welch's book that the antibiotic tyrothricin marks the beginning of the "antibiotic age". This antibiotic was first described by Dubos in 1939, some ten years after Fleming had announced the discovery of penicillin. During that ten years the sulphonamides were introduced and a great amount of experimental work was done, every conceivable aspect of the chemotherapeutic approach to the treatment of infectious diseases having been explored. Welch describes this as the first marked advance in chemotherapy since the introduction of salvarsan by Ehrlich. The finding of tyrothricin was largely the result of planned research; Welch describes the discovery of penicillin as "in the nature of a fortunate chance". Dubos was looking for an enzyme from soil bacteria able to dissolve the capsule surrounding the organism which causes lobar pneumonia. He argued that since all types of organic matter are decomposed by soil organisms, there should be some special types that could destroy pathogenic bacteria. He inoculated soil samples with pathogenic bacteria, and ended by isolating the aerobic spore-forming bacterium later classified as *Bacillus brevis*, which produces tyrothricin. Tyrothricin is the partially purified antibiotic obtained from the culture fluid of *Bacillus brevis*. The active ingredients consist of gramicidin, 13% to 22%, and tyrocidine, 78% to 87%. Gramicidin is for all practical purposes the active principle of tyrothricin and is almost wholly responsible for its therapeutic efficiency. Welch then describes the isolation and development of penicillin, streptomycin, bacitracin, chlortetracycline, chloramphenicol, oxytetracycline and tetracycline, and discusses each of them in turn in separate chapters. He also devotes a chapter to polymixin, neomycin, viomycin, subtilin and fumagillin.

One of the most important aspects of antibiotic therapy for the clinician is synergism and antagonism. This has been mentioned from time to time in the editorial columns of this journal. A discussion will be found under the heading of "Current Comment" in the issue of June 30, 1951. The work discussed on that occasion was a communication by E. Jawetz and co-workers. A special chapter is devoted to it in Henry Welch's book; the chapter is by Gladys Hobby. The definition of synergism quoted by her is that introduced in 1923 as "the living together of two organisms, resulting in a change that could not be brought about by either organism alone". She states that synergism generally implies to the pharmacologist the positive algebraic summation of the effects of two agents capable of producing the same end result, while antagonism implies the negative algebraic summation of their effect.

[1] "Principles and Practice of Antibiotic Therapy", by Henry Welch; in collaboration with Braley, Clark, Dowling, Finland, Herrell, Hinshaw, Hobby, Keefer, Knight, Pulaski, Rein, Ross, Smadel, Weinstein, Woodward and Zander; specially edited by Félix Martí-Ibáñez; 1954. New York: Medical Encyclopedia, Incorporated. New York and London: Interscience Publishers, Incorporated. 8½" × 5½", pp. 720. Price: $12.00.

[2] "Antibiotics Annual, 1954-1955: Proceedings of the Second Annual Symposium on Antibiotics", edited by Henry Welch, Ph.D., and Félix Martí-Ibáñez, M.D.; 1955. New York and London: Interscience Publishers, Incorporated. 10" × 6½", pp. 1164, with many illustrations. Price: $10.00.

Hobby refers to the work of Jawetz *et alii* and states that antimicrobial agents have been divided into two groups. Group one consists of penicillin, streptomycin, bacitracin and neomycin: drugs which act best against rapidly multiplying bacteria, drugs whose bactericidal concentrations are only slightly higher than their respective bacteriostatic concentrations. The second group consists of chlortetracycline, oxytetracycline and chloramphenicol: drugs that are principally bacteriostatic in action. According to Jawetz and his associates, members of the first group may act synergistically with each other, or they may be indifferent to each other. To be an effective member of a synergistic pair, the agent must be capable of exerting some effect on the microorganism, although the concentration required to show such an effect by convenional susceptibility test methods may be high. It is held that members of group II may be additive when used in combination with each other. The main point of practical importance for the clinician to remember is that a combination of a member of group one with a group two agent may result in decreased effectiveness if the organism is highly susceptible to the former. At the end of her chapter, Hobby states that the importance of in-vitro observations of synergism and antagonism resides largely in that they serve as a guide to clinical therapy. She quotes Jawetz and Gunnison, who made a report to the Council on Pharmacy and Chemistry of the American Medical Association. In this report they stated that the most important feature was the variation in the response of microbial strains to drug combinations. They added that this emphasized the impossibility of labelling certain drug pairs as synergistic or antagonistic, and stressed the desirability of laboratory guidance in those occasional difficult situations in which drug combinations were essential for cure.

The section of Welch's book which is devoted to the antibiotic therapy of infectious diseases contains a wealth of information. It is given under the headings of the different types of infections. Thus we have pneumococcal and streptococcal infections; staphylococcic infections; meningococcal and gonococcal infections; treponemal diseases; spirochætal diseases other than the treponematoses; surgical infections; urinary tract and intestinal tract infections; brucellosis, plague and tularæmia; antibacterial drugs in the treatment of tuberculosis; virus and rickettsial diseases; and a miscellaneous group. To give any idea of the contents of these chapters is clearly impossible. It need only be stated that the practitioner who is looking for reliable information on this subject will find it here. Special reference should be made to a chapter in the "Antibiotics Annual" by W. F. von Oettingen. He deals with untoward effects resulting from the indiscriminate use of antibiotics, and calls his chapter "An Appraisal of the Literature". At intervals through his article he states a conclusion or a group of general conclusions. It will suffice if we reproduce some of these. The first one states that it is apparent that medication with antibiotics may produce certain side reactions, sometimes of serious character, and with some of them more or less permanent injury. Although in most instances such reactions occur relatively seldom and are of temporary nature, they may be severe, and occasionally even may endanger life. In addition, in most instances these reactions occur after repeated administration of antibiotics, and this should be a warning against their indiscriminate use, especially in the treatment of those patients for whom they are not strictly indicated. After a discussion on bacterial resistance to antibiotics, von Oettingen points out that the reports contain conclusions which vary considerably in their significance. He states that the danger of the formation of strains of bacteria resistant to antibiotics is not as great as some of these reports might suggest. However, he insists that it is established that the promiscuous use of antibiotics may result in an increased resistance of certain strains to some of them. His third conclusion is that suppression of the normal bacterial growth in the intestinal tract may lead to secondary infections, which although in most instances of less serious nature, lead occasionally to severe and even fatal complications. Infections by monilia have been mentioned in this respect from time to time in the columns of this journal. The fourth conclusion is that prolonged oral administration of certain antibiotics and the resulting changes in the intestinal bacterial flora may bring about a deficiency in certain vitamins. Von Oettingen's final conclusion has been stated over and over again, but it must be repeated once more. It is that antibiotics should not be used for minor and ill-defined infections, because they may become useless in a subsequent major illness. This applies especially to topical applications. Antibiotics should be carefully selected according to the type of infection, and patients treated with antibiotics should be watched carefully for the appearance of side reactions. Further, and by no means of the least importance, antibiotics should not be incorporated in such articles as chewing-gum and tooth-paste. There is in very truth a real danger that antibiotics as a weapon may be dulled by indiscriminate use, by non-restriction of their use for curative purposes only in those cases in which they are really indicated.

In conclusion, attention should be drawn to a paper in the symposium by Allen E. Hussar, entitled "A Proposed Crusade for the Rational Use of Antibiotics". He states at the outset that antibiotic research has three goals: (*a*) to find new and better agents, (*b*) to produce better preparations of the known drugs, and (*c*) to find more effective and less harmful methods of antibiotic administration. The main points in his recommendations are as follows. In the first place he thinks that the symposium which he was attending should issue a Press release to be published in the major medical journals, condemning the irrational use of antibiotics. This kind of condemnation has been made over and over again in all medical journals. We also recall that what has become known as an "antibiotics worksheet" was published in this journal on February 26, 1955, at the request of the National Health and Medical Research Council. This document has had a particularly wide circulation both in Australia and elsewhere. The second recommendation is that undergraduate and graduate medical students should receive systematic and comprehensive education in the field of antibiotics. It is pointed out that at least two facts justify this recommendation. In the first place, a greater number of patients require antibiotic therapy than care by any single special field of medicine. In the second place, it is obvious that recognition of the antibiotic agent proven most active *in vitro* or *in vivo* against a certain pathogenic organism is only a fraction of the knowledge required to prevent or combat infections. Therapeutic failures and untoward

complications will frequently ensue when one is not acquainted with the general characteristics of the antibiotics now in clinical use, or when one lacks a knowledge of such fundamentals as the mode of action of antibiotics, the factors influencing antibiotic activity, the causes of therapeutic failures, the nature and mechanism of complications of antibiotic therapy, and the role of the clinical laboratory in antibiotic medicine. Only when the physician has this knowledge will he be able to decide correctly when, what and how to prescribe antibiotic therapy. Hussar's third recommendation is that post-graduate education in antibiotic medicine should be made available and accessible to all practising physicians. Any comment about this recommendation would be to the effect that graduate education for practising physicians should be available in all subjects, not only in antibiotic medicine. He also recommends that proper ways and means should be found to educate the lay public to give up self-medication, and to abandon the common practice of demanding antibiotic treatment from their doctors. This will probably be impossible while these drugs are hailed everywhere as "wonder drugs". Medical practitioners will all agree that a campaign should be undertaken to secure the rational use of antibiotics. As has already been suggested, an attempt must be made to teach the members of the general public what they should know on this matter, and these drugs can everywhere be put, if desired, beyond the reach of lay persons. In other words, the remedy lies largely in the hands of medical practitioners themselves. The first requisite is that their own outlook on the question shall be temperate, and then that their whole treatment shall be directed to the welfare of the patient in regard to the illness from which he is suffering at the moment, in regard to any future illnesses which may befall him, and in regard to the efficiency of antibiotic agents in general.

Attention may be drawn to two forms of acknowledgement made by Henry Welch at the opening of the symposium. He thinks that first of all credit should be given to those who have been responsible for the isolation, development and clinical evaluation of the drugs in question. The second group are often forgotten; they are the persons who have organized and established the antibiotic industry, and who were responsible in the year 1953 for the production of over 2,000,000 pounds in weight of these drugs. Antibiotics are increasing in number at a rapid rate. It is by paying attention to such books as those which have been under discussion that practitioners can make some attempt to keep up with the great advances that are being made.

Current Comment.

SURGICAL REMOVAL OF FOCI OF EPILEPTIC SEIZURES.

HUGHLINGS JACKSON postulated the theory that an epileptic seizure begins with a ganglionic discharge in some area of grey matter. It would seem logical, therefore, to locate the focus of such a discharge and extirpate it. Wilder Penfield and Kenneth Paine[1] have prepared a report on surgical removal of epileptic foci during the last twenty years. They point out that if the focus was always discrete, and at a site where surgical removal could be complete without causing damage to normal cortex, the operation would be simple, but these desiderata rarely exist. The location of the focus can be determined by the nature of the initial phenomenon, whether sensory, motor or psychical, by electroencephalography, either over the scalp or directly upon the brain at operation, by stimulation of the exposed brain, and often by observation of obvious lesions at operation. The presence of a tumour or cyst may be obvious, but the epileptogenic focus lies in the grey matter that is still alive but has taken on abnormal activity because of some pathological influence, so that simple removal of a tumour, without removal also of the compressed, atrophic gyri that adjoin it, may produce no relief of the epilepsy at all. The general conclusion of the authors is that one feature is common to all cortical epileptogenic lesions: a slight, persistent inadequacy of circulation. The patches of acute swelling, oligodendroglia, fibrous gliosis, and other common lesions of this nature can be regarded as secondary to ischæmia of some kind or another. However, atrophic gyri of identical appearance often exist without causing any epileptic sequelæ, so there are still further factors to be discovered.

An analysis of 234 cases revealed birth lesions as the cause of 36%, other traumatic lesions causing 34%, and six other minor categories causing the remaining 30% of focal cortical seizures. During the six years from 1945 to 1950, 219 cortical excisions were performed, and in 15 patients exploration revealed no focus and no excision was carried out. There were four deaths. Adequate follow-up has been secured in 217 cases. None of the "negative" exploration patients had any relief from their seizures. Of the patients subjected to cortical excision, 25% had a perfect result and 17% a nearly perfect result; 20% had a satisfactory result; 18% had slight improvement and 17% no improvement.

Besides the effect of the operation on the occurrence of epileptic seizures, these authors analysed the collateral results. Economically, before operation 79 of 203 patients were fully employed, but now five of these cannot work and two are in mental homes; on the other hand, 51 not previously working are now working, and 38 others are employable if not employed. Physically, of 159 patients who had normal or nearly normal motor and sensory function before operation, 26 developed some degree of motor or sensory disability, from slight to severe (two with hemiplegia); but in eight weakness or paralysis diminished. Thirty-two patients developed a visual field defect as a result of excision in the posterior temporal or occipital regions. After cortical excision in the dominant hemisphere there was frequently some transient aphasia, but only three patients had any permanent defect. There was progressive mental deterioration in three patients who were assessed as having a nearly perfect result, and in 21 with little or no improvement.

These are impressive figures, and it seems that these authors have proved that their methods are successful. Patients with cortical focal epilepsy are unable to live happily or efficiently, and the operation of focal excision offers three-quarters of them a chance of a good to perfect result; half of the patients in this series have been free of seizures for many years. With improvements in techniques for localizing foci, even these figures may be bettered.

[1] *Canad. M. A. J.*, October 1, 1955.

TISSUE TRANSPLANTATION.

THE transplantation of autogenous tissues is relatively simple. At least, grafts of skin, bone, cartilage and fascia taken from the patient's own body are assimilated without any reaction. The only limit to their use is one of supply, since there is no advantage in creating a considerable deformity in one part of the body to repair another part. The same limitation affects grafting from one uniovular twin to the other—here also there is no reaction. Occasion-

ally, too, embryonic tissues have been grafted without reaction. Robert B. Brown, in his Mary Scott Newbold Lecture for 1955, delivered to the College of Physicians of Philadelphia,[1] discusses very fully the question of homogeneous grafts. Apart from the above instances, a graft, even from one member of a species to another closely related one, survives only for a time and is then destroyed or replaced by the host. Cornea and cartilage arouse the least reactions, possibly because they are relatively avascular structures; the initial reaction against homografts is one of vascular thrombosis and necrosis with round-cell infiltration. The time lag before the reaction sets in is about as long as that necessary for the formation of antibodies against any ordinary antigenic stimulus; and if a second graft from the same donor is used, the reaction time is much shorter. All the available evidence points to the development of a systemic reaction analogous to an active immunization process, but no actual proof of this has so far eventuated. In attempts to circumvent this reaction homograft tissues have been treated with chemicals, heat, cold and irradiation, and tissue explants have been cultured in the prospective recipient's plasma or serum; in order to reduce the reaction recipients have been irradiated, given cortisone or nitrogen mustard, had their spleen removed, and been subjected to various other procedures, with doubtful success. In the final analysis, homovital grafts, such as glands which are to continue their active function, fail to take; while homostatic grafts of inert tissues which have been devitalized by storage or preparation processes can be used with success, even if their only function is to provide a framework for the host's tissues while replacing them. Brown evaluates the methods of preparing various tissues; freeze-drying seems to be the most useful for all tissues except cornea. Incidental points of interest in his lecture are the successful use of arterial grafts for replacing tendon sheaths, and the failure of these to replace the œsophagus, bile duct and ureter; the successful use of dura and nerve implants; and the use of polyethylene tubing as a shunt from the left subclavian artery to the descending aorta to maintain a circulation, instead of completely cutting off the circulation and depending on hypothermia. It is perhaps strange that in this very comprehensive paper two possible factors receive no mention at all—it would seem reasonable to try whether tissues from a donor whose blood was completely compatible with that of the recipient would produce less reaction than tissues from an incompatible donor; and to try whether tissues from a donor of the same sex as the recipient would produce less reaction than from a donor of the opposite sex, in view of the difference that the presence or absence of the large sex chromosome might make. If there were any significant differences between these classes of grafts—and it is not unlikely that the occasional paradoxical success might be due to a coincidence of sex and blood compatibility—then we should have advanced a long way along the road to understanding this important problem.

ALBERT NEISSER: A CENTENARY.

THIS year marks the centenary of the birth of a famous pioneer in modern venereology, Albert Neisser, who was born on January 22, 1855. That his contribution to medical knowledge and to human welfare was notable is apparent from a paper by L. W. Harrison[2] read before the Osler Club to celebrate the centenary earlier this year. It is interesting to learn that Neisser's M.D. thesis, submitted at the age of twenty-two years, dealt with diseases due to *Tænia echinococcus*, thus disclosing early, as Harrison states, his taste for precision in instruments of diagnosis, microscopy in particular. In 1879, when he was only twenty-four years of age, he announced in a preliminary communication that he had seen in gonorrhœal pus certain cocci of distinctive appearance which he regarded as the cause of the disease. It is fitting that this organism, the gonococcus, is today properly styled *Neisseria gonorrhœæ*, and microorganisms having similar morphological characteristics are Neisseriaceæ. At the age of twenty-seven years Neisser succeeded his chief, Oskar Simon, as Professor Extraordinary and Director of the Department of Dermatology in the University of Breslau and went on to make many notable contributions to the understanding and management of both gonorrhœa and syphilis. Some of his most memorable work was research on syphilis carried out over many years in Java, where he went in order to have access to monkeys for experimental purposes. This work was associated with that of such men as Wassermann and was of permanent value. Apart from this, Harrison suggests that the contributions made by Neisser to venereology which stand out most strikingly are (i) his insistence on the control of the treatment of gonorrhœa under guidance by microscopic examination of discharge, (ii) his stand against the indiscriminate use of astringents in the treatment of gonorrhœa, and (iii) his very early insistence on the concurrent use of mercury, preferably in the form of insoluble suspensions, with arsphenamine remedies in the treatment of syphilis. The soundness of Neisser's work and contributions to knowledge are brought out strikingly by Harrison against the contemporary background, in which widely held ideas (for example, on the treatment of gonorrhœa) were sometimes fantastically wrong. Neisser could not look forward to present-day advances in the management of venereal disease, which would doubtless have delighted him, but he made a great contribution in his day. Little further commentary is needed than the fact that in 1916 (when, as Harrison puts it, rivers of hate were running between Germany and England) *The Lancet* wrote in Neisser's obituary: "By the death of Albert Neisser on July 30, Germany lost one of her greatest scientists and the whole world is poorer for the loss."

[1] *Tr. & Studies Coll. Phys. Philadelphia*, August, 1955.

[2] *Brit. J. Ven. Dis.*, June, 1955.

CONTROL OF SALICYLATE POISONING.

POISONING from the accidental ingestion of salicylates (usually by children) has not been frequently reported in this country and is presumably not a major risk. Nevertheless, it occurs, and that too easily. In a survey of acute accidental poisoning of children in Queensland published in this journal on November 24, 1951, D. Clark Ryan reported 16 cases of poisoning by salicylates in various forms (mostly acetylsalicylic acid) among children admitted to Queensland hospitals between 1946 and 1949, with one death from ingestion of methyl salicylate. The total number of cases of poisoning in the period surveyed was 1204, so the figure of 16 seems small; but it was exceeded only by the number of cases of poisoning by kerosene (618), barbiturates (36) and petrol (32). There is no reason to think that the figures for the rest of Australia would differ materially from those for Queensland, so the Australian total would not be negligible, especially if it is accepted that many children are not sent into hospital.

In the United States of America the matter has caused more concern and aroused action. A report,[1] originated by the Committee on Accident Prevention of the American Academy of Pediatrics, and adopted by the Committee on Toxicology of the Council on Pharmacy and Chemistry of the American Medical Association, emphasizes the danger of salicylate poisoning among pre-school children. It states that salicylate compounds are known to have caused 113 deaths in the United States in 1952; of these, 86 were in children under five years of age. Methyl salicylate was responsible in 21 cases and aspirin in 41 cases. In most of the remaining cases the type of salicylate was not specified, but reports from both private and hospital practice indicate that aspirin is most often responsible, especially the flavoured preparations. The reasons for these are only too clear: first, aspirin is in common use and is left lying around the house; second, most people have the mistaken

[1] *J.A.M.A.*, July 9, 1955.

impression that it is harmless; third, forms prepared for administration to children are often very attractive.

With these points in mind the two committees issued the following recommendations: (i) The labels of all bottles and packages containing salicylate compounds should bear a clearly visible warning that the contents should be kept away from children, and that medical advice should be sought for dosage of the drug for children under three years of age. (ii) The number of tablets in each container of aromatic or sweetened children's aspirin should be limited so that the total content is approximately 25 grains of aspirin. (iii) Salicylates should be packed to make accidental access more difficult—for example, with individual wrapping in metal or plastic foil or a type of closure that cannot be removed by a child. The committees have asked all manufacturers and distributors of salicylates to help in implementing these recommendations and have urged voluntary agencies having access to homes where there are young children to issue suitable advice on the subject.

A further interesting development is the adoption of the following statement in February, 1955, by an advisory panel including representatives of industry, medicine and pharmacy assembled in Washington by the Food and Drug Administration:

> 1. The labels of all bottles and packages of salicylate-containing preparations should bear the following minimum statement, clearly visible and in boldface type: "Warning: Keep out of the reach of children." 2. In lieu of specific dosage recommendations for children under 3, salicylate-containing preparations for oral use should bear the following label: "For children under 3 consult your physician." 3. This group believes that dosage forms of several strengths of children's aspirin are undesirable and looks with favor on concentration by manufacturers, wherever possible, on a standard strength of children's aspirin of 1¼ grains (80 mg.) per dosage unit. 4. This group looks with favor on manufacturers not increasing their present maximum amounts of children's flavored aspirin per package unit and encourages seeking development of a safety closure and container. 5. This group looks with favor on wider and more effective use of educational means to inform physicians, pharmacists, and consumers of the hazards involved in accidental ingestion of salicylate-containing preparations.

It will be of considerable interest to learn the outcome of these moves in the United States in case we have to take some similar action in Australia.

MALARIA IN THE TREATMENT OF NEPHROSIS.

IN the absence of accurate knowledge of the ætiology of nephrosis, any treatment is of necessity empirical. Three years ago two English workers, E. Byrne and D. Gairdner, independently reported remissions in the course of nephrosis after the patient had been infected with malaria. Now Gairdner, in conjunction with P. G. Shute,[1] reports on 65 patients with nephrosis who were infected with malaria. Of these, 51 had pure nephrosis, with gross œdema, proteinuria, hypoalbuminæmia, hypercholesterolæmia, but no hypertension, no sustained azotæmia, and little or no hæmaturia. Fourteen showed complete remission; five of these had had either cortisone or corticotrophin previously, with little or no effect. Eleven of the pure nephrosis patients had partial remission of their condition. Of 14 patients with nephrosis and nephritis, five had partial remissions. In each instance the infecting organism was *Plasmodium vivax*, but for two patients in whom a second malarial infection was later desired, *P. malariæ* was used; one of these died on the fifth day of pyrexia, partly at least because of the malaria, and the other had a rather stormy course for a time, though he finally had a complete remission of his nephrosis. That 14 of 51 patients had a complete remission of nephrosis after therapeutic infection with malaria is of considerable importance, since this is a much higher figure than would be accounted for by spontaneous remissions, and the result compares not unfavourably with the results of other forms of treatment. It is necessary, however, to offer two general warnings. The strains of malaria which are used at the Malaria Laboratory at Epsom are usually strains which have been "tamed" by many therapeutic passages, and whether a wild strain could safely be used for a very ill patient might be doubted; secondly, chronic infection with *P. malariæ* itself causes severe nephritis, so that this species would advisedly be used with caution in pure nephrosis and not at all in nephrosis complicated by nephritis. Speculation on the mode of action of the malarial infection, in the absence of any knowledge of the ætiology of nephrosis, would be idle.

[1] *Lancet*, November 5, 1955.

PRIMAQUINE AND FALCIPARUM MALARIA.

THE occasional occurrence of resistance by malaria parasites to some of the modern antimalarial drugs has made it necessary to pursue investigations of all available drugs and their effects on various stages of the parasite cycle. A recent report by John Arnold and seven of his colleagues[1] concerning the effect of primaquine on *Plasmodium falciparum* is of some value in this regard. These workers used a strain from Panama, designated P-F-6, which had rapidly developed resistance to pyrimethamine; they tested primaquine against it for causal prophylaxis and for single-dose therapy. Their results indicated that primaquine had its most powerful effect on the early pre-erythrocytic stages of *P. falciparum*. When a single dose of from 10 to 45 milligrammes was given on either the first, third or fifth day after inoculation, the effect was fair on the first day, maximal on the third day, and negligible on the fifth day. This indicates a sharply falling curve in the parasite's susceptibility to the drug.

By the sixth day, in falciparum malaria, asexual forms are being produced, and single-dose therapy had no effect on this stage. Thus, as there is no way of determining which would be the third day after a natural infection, the effectiveness of primaquine at this period has no practical application, because the drug is far too toxic to be given as a routine prophylactic over a long period, even if it were spaced out every three days. This conclusion, coupled with the already known fact that primaquine has no worthwhile effect on trophozoites, affords final proof that primaquine has no place whatever in the prevention or treatment of falciparum malaria.

[1] *J. Lab. & Clin. Med.*, September, 1955.

PUBIC OSTEITIS.

RELATIVELY few cases of pubic osteitis have been described in the literature. J. H. Weggelaar[2] had a patient who developed this condition seven weeks after having been operated on for a vesical calculus by the suprapubic route; he had a firm tumour, the size of a fist, above the symphysis; it was fixed and tender. Radiologically there were marked widening of the symphysis and osteoporosis of the rami. After treatment with cortisone the tumour began to decrease in size and the bone to increase in density; before recovery was complete, however, the patient died of a cardiac infarct. The post-mortem report stated that the condition was chronic non-specific osteomyelitis and periostitis, although *Bacillus pyocyaneus* was cultivated from the area.

Weggelaar found that of all reported cases, most supervened on an operation in the region of the bladder and prostate, although the condition had followed pyelonephritis and local trauma in isolated instances. He found, moreover, that all reports described spontaneous healing after many months, so that it would seem that the effect of cortisone in his own case was more apparent than real, and that the treatment, in common with the exact ætiology of this condition, still remains obscure.

[2] *Arch. chir. neerl.*, 1955.

Abstracts from Medical Literature.

PÆDIATRICS.

Fibrocystic Disease of the Pancreas with Normal or Partial Pancreatic Function.

P. A. DI SANT'AGRESE (*Pediatrics*, June, 1955) describes nine patients with "fibrocystic disease of the pancreas" in whom pancreatic function was partially or completely unaffected. By means of duodenal assay and fat and nitrogen balance studies pancreatic function was assessed as being normal in three patients, partially present in three, and in the remaining three normal at first but decreasing to low levels later. The author stresses the point that the nutritional and alimentary signs of this generalized disease reflect the degree of pancreatic involvement; he states that when this is normal, signs of typical pulmonary disease have prompted investigation for the presence of "fibrocystic disease of the pancreas". Abnormality of sweat secretion and a positive family history of the disease make the inclusion of such cases under this diagnostic label reasonable. In 99% of cases of "fibrocystic disease of the pancreas" the sodium and chloride content of sweat has been found to be abnormally high, and high values have been found in some apparently unaffected relatives. The conclusion is reached that "fibrocystic disease of the pancreas" is not primarily a disease of the pancreas but a generalized condition with varying involvement of pancreas, lungs, liver and sweat glands.

Splenectomy in Mediterranean Anæmia.

D. H. CLEMENT AND M. TAFFEL (*Pediatrics*, September, 1955) have noted beneficial results from the performance of splenectomy in four patients with Cooley's anæmia. They point out that although the primary defect in this anæmia is an inability to synthesize adequate amounts of hæmoglobin, a hæmolytic component associated with splenomegaly eventually aggravates the clinical condition. In many individuals with the severe form of the disease it is possible to calculate that donor blood is not surviving nearly as long as might be expected. In these patients splenectomy may be performed without any need for performing red cell survival studies. In such cases, when the disease is severe and of some duration, the spleen is greatly enlarged and the transfusion requirements are great, transfusions may be diminished to one-half or one-quarter of the pre-operative requirements. Secondary benefits include improved disposition, greater activity, some diminution in the risk of transfusion siderosis and less psychic trauma to the child.

Hypernatræmia in Infants.

L. FINBERG AND H. E. HARRISON (*Pediatrics*, July, 1955) have analysed the findings in 88 infants in whom serum sodium concentrations over 150 milliequivalents per litre were found. The large majority of these infants were suffering from diarrhœal diseases, but in eight hypernatræmia developed during respiratory illness. Sudden curtailment of water intake or excessive salt intake had occurred in all. In two-thirds of these patients manifestations referable to the nervous system were present. Such signs included lethargy, coma, shrill cry, hypertonus, twitchings, convulsions, and elevated protein content in the cerebro-spinal fluid. Two infants were found to have extensive subarachnoid hæmorrhage at autopsy, and four were left with severe neurological sequelæ after the episode of hypernatræmia. Despite great reduction of body water on admission to hospital almost half of the infants did not appear clinically to be dehydrated, though a doughy or "sclerema-like" texture of the skin and subcutis was striking in a few. Hypocalcæmia was noted in a number of the infants, and it was possible to show that a large intracellular deficit of water existed in all. The authors state that treatment is difficult, and it is suggested that the repair solutions given should be relatively dilute with respect to sodium, but not free from it. A sodium concentration of from 15 to 40 milliequivalents per litre gives best results. Prompt correction of potassium deficiency is necessary, and awareness of the possibility of the presence of hypocalcæmia facilitates therapy.

Anaphylactoid Purpura.

R. J. P. WEDGWOOD AND M. H. KLAUS (*Pediatrics*, August, 1955) made a long-term follow-up of 26 children with anaphylactoid purpura (Schönlein-Henoch syndrome). The average length of follow-up was four and a half years. The age at onset was most frequently between two and four years, and 17 of the patients were male. Ten of the children had persistently abnormal urinary findings characterized by hæmaturia rather than proteinuria. Four children had average urea clearances below 70% of normal, and one child was unable to concentrate urine above a specific gravity of 1·015. These abnormal urinary findings were more common in children who were over six years of age at the time of onset of purpura, and were more common in, though not restricted to, the group in whom abnormal urinary findings were present at the time of onset. It is suggested that some cases of chronic nephritis of unknown ætiology seen in adults are the end-result of these sequelæ of anaphylactoid purpura.

Megacolon, with Particular Reference to Hirschsprung's Disease.

C. M. LEE (*Surgery*, May, 1955) states that the term megacolon is a symptom rather than a disease. It represents the physiological response to incomplete mechanical obstruction. The obstruction may result from a number of different and unrelated causes. These include (i) chronic fæcal impaction, with or without associated anal fissure and sphincter spasm, (ii) organic anal or rectal strictures, generally congenital, (iii) tumours, benign or malignant, intrinsic or extrinsic, of the anus and rectum, (iv) the rare phenomenon of primary congenital elongation of the colon with excessive water absorption, and (v) achalasia of a terminal segment of large bowel of variable length, due to absence or marked deficiency of the ganglia in Auerbach's and Meissner's plexuses—true Hirschsprung's disease. The author discusses the latter condition, giving views based on personal experience of 43 cases. He states that the disease is commonly characterized by symptoms of acute intestinal obstruction within two days of birth. He considers the obstruction as functional resulting from the achalasia, and this he describes as being due to the fact that the affected segment is incapable of conducting an orderly pattern of propulsion peristaltic waves and so responds to sympathetic stimulation by a state of mass contraction or non-relaxation. The severity of the clinical manifestations varies with the length of the achalasic segment, with its location and with the duration of the disease. In rare instances the ganglion deficiency is central and segmental, with normally innervated bowel both proximal and distal to the aganglionic segment. Another and, fortunately, unusual manifestation occurs when the ganglion deficiency affects the entire large bowel and rectum and sometimes the small bowel as well, in continuity. Diagnosis of congenital megacolon can be made usually on the following points: (i) symptoms of severe low intestinal obstruction with marked abdominal distension begin during the first few days of life; (ii) symptoms are relieved by frequent high enemas and promptly recur when enemas are omitted; (iii) sometimes the gas pattern as seen alone on radiographic examination will make the diagnosis possible, but even then confirmation by barium enema examination should be sought. The author points out that normal saline should be used for the enemas, not tap water, because of the danger of water intoxication. Discussing management, he emphasizes the fact that the severity of the symptoms varies directly with the length of the aganglionic segment. When it is relatively short, decompression of the bowel is possible either spontaneously or by conservative therapeutic measures. In these circumstances, operation is deferred until the infant is eight to twelve months old. A one-stage operation can then be performed with greater ease and safety than at any other time. When the segment is more than eight to ten centimetres long, the symptoms are severe, and decompression by enemas is difficult and ineffective. In such cases, a left lower quadrant colostomy in the most distal portion of dilated bowel will prevent extensive dilatation and episodes of acute obstruction, and will permit elective definitive surgery at a more favourable time. The author uses Swenson's technique of performing the colostomy in the distal dilated area and simply closing the colostomy opening and resecting it along with the achalasic segment at the second operation. A one-stage procedure is always to be preferred when the circumstances permit. However, if there is any question about the physical condition of the infant, or the technical experience of the surgeon with this particular

operation, a temporary colostomy is advisable. The author then describes the detail of the technique of this formidable operation and gives some valuable suggestions directed towards preventing some of the post-operative complications. He first followed Swenson's technique, but more recently has used Heath's modification. He details the suturing technique very fully, as he believes that herein lies one of the chief sources of complications. He uses fine chromicized catgut rather than silk and no drainage.

ORTHOPÆDIC SURGERY.

Capsulectomy of the Interphalangeal Joints of the Fingers.

R. M. CURTIS (*J. Bone & Joint Surg.*, December, 1954) has studied a group of 50 patients, 25 of whom presented a limitation of extension of the fingers and 25 a limitation of flexion of the fingers, as a result of mechanical limitation at the interphalangeal joints. In these patients, 72 interphalangeal joints were subjected to surgery, in order to improve function after conservative measures had failed. The author states that an operative procedure in which a lateral approach is used allows the operator to excise a portion of the collateral ligament from each side of the joint without disturbing the stability in the proximal interphalangeal joint. At the same time it provides easy access to all other structures which may play a role in blocking extension or flexion of the fingers at the interphalangeal joints. After the patient is able to flex within one inch of the distal palmar crease it is better judgement to rely on conservative measures to improve flexion. The more anatomical structures are involved in the limitation of motion, the poorer is the end result. If the only limiting factor for flexion in the interphalangeal joint was a capsular ligament, then capsulectomy of the collateral ligaments gave a good result, for both flexion and extension. On the other hand, if it was necessary to free the extensor tendon over the proximal phalanx and to perform a tenotomy of the interossei and a capsulectomy of the collateral ligaments, in order to obtain flexion of the proximal interphalangeal joint, then the end result achieved by surgery was not so good. This was particularly true of the finger bound by cicatrix.

The Problem of the Broken Judet Prosthesis.

K. H. PRIDIE (*J. Bone & Joint Surg.*, May, 1955) states that fracture of the Judet prosthesis is suggested by a decrease of movement in the hip and the gradual reappearance of pain and muscle spasm, usually in the second year after operation. The structural breakdown in these cases follows a definite pattern. First the prosthesis becomes loose, then the rim begins to fracture, and finally the stem breaks, with the steel insert as well, or the insert remains intact and breaks at a later date. In two cases the fracture was sudden, the insert breaking with the stem. If the disintegration was slow, stages one and two were followed by loss of function, pain and muscle spasm. In stage three there were severe pain and collapse of the leg, and all the signs of an intracapsular fracture of the neck of the femur. The author believes that the acrylic head prosthesis operation should be abandoned for any patient who intends to lead an active life or to earn his living. He also points out that 80% of the patients are satisfied and consider that the operation was well worth while. He considers that the operation is a good one, but the material of the prosthesis has been found lacking. He goes on to state that in the early stages, when radiographs show that the stem is eccentric, three months in plaster might allow the prosthesis to gain sufficient fixation with fibrous tissue to afford relief. But if this does not help, there is no virtue in waiting until the inevitable fracture occurs. The operation should be revised and a more ambitious type of prosthesis used. An alternative solution in cases of fractured prosthesis lies in the Girdlestone operation, which has certain merits for this complication. It is final and introduces no new foreign substance that may break down or come to grief in the body, and no substance that will wear. Another good feature of the Girdlestone operation in such a case is that its usual weakness—that is, instability of the hip—is unlikely to be evident, for there will already be a mass of firm fibrous tissue in consequence of the first operation. On the whole, the author considers that the Girdlestone operation—that is, removal of the head and neck of the femur—is the most satisfactory answer to the problem of the broken or failed acrylic prosthesis.

Peroneal Spastic Flat Foot.

N. J. BLOCKEY (*J. Bone & Joint Surg.*, May, 1955) has investigated 30 feet in 27 patients with peroneal spastic flat foot. In all cases the foot was examined under anæsthesia to assess the degree and rigidity of the eversion. A walking plaster was then applied with the foot inverted as far as possible and retained for three months, after which the range of active and passive movement was determined. Thereafter treatment was by physiotherapy, sometimes with lateral irons and shoe alterations for two years. When subtalar and mid-tarsal arthrodesis was required, it was undertaken at the end of the two-year period. In the present series of 30 abnormal feet, nine showed a calcaneo-navicular anomaly varying in degree from a prolongation of the anterior process of the calcaneum to a complete bony bar. Four showed a talo-calcaneal bridge. Two of these four showed mid-tarsal lipping, said to confirm the presence of this developmental anomaly. The author suggests that the presence of a tarsal anomaly does not necessarily mean that the foot is incorrigibly stiff, and states that some of these feet show a full range of movement under anæsthesia. There was no constant relationship between the degree of rigidity and the degree of radiographic abnormality. The author considers that the *peroneus brevis* is the muscle which is the chief contributor to the deformity of the foot. In addition, in some cases the whole lower limb lies in eversion owing to adaptive shortening at the hip consequent on a gait of habitual lateral rotation at the hip. As the gait of these patients is one of habitual lateral rotation of the hip, the deformity of the hip is due to adaptive shortening of the soft tissues rather than to lateral rotator spasm. There is no evidence from this series of cases to suggest that either organic nervous disease or psychiatric disturbances played a significant part in the production of the deformity, or that the deformity is a manifestation of generalized rheumatoid arthritis. The author states that in view of the frequency of minor tarsal anomalies among this series of 30 feet, it seems likely that all feet presenting the deformity of peroneal spastic flatness are to some degree structurally abnormal, although the exact site of the abnormality may escape us.

Surgical Treatment of Spondylolisthesis without Spine Fusion.

G. G. GILL *et alii* (*J. Bone & Joint Surg.*, June, 1955) state that it seems evident that the removal of the underdeveloped and loose lamina does not increase the so-called "instability" of the lumbo-sacral junction. If the defect in the *pars interarticularis* is supposed to cause instability, then the removal of the mobile fragment should not increase the instability. If the loose lamina is not very mobile there may be no irritation of the dura. If the defect in the *pars interarticularis* is more posteriorly situated, pressure on the fifth lumbar root cannot develop. Conversely, if the defect is anterior, the likelihood of compression of this root will be greater. The authors have found from the experience of operation in 20 cases that there is a great variation in the mobility of the loose lamina of the fifth lumbar vertebra. A fibro-cartilaginous mass was consistently found at the defect. This was larger on one side than on the other, but it corresponded in general with the neurological findings. When the lamina was exceedingly mobile and the spine was extended, pressure occurred on the mass of fibro-cartilage at the defect, thus increasing pressure on the fifth lumbar nerve. In others the loose lamina rocked downwards, causing traction on the first sacral roots where they passed towards the first sacral foramen. Adhesions were frequently found between the dura and the *ligamentum flavum* below the anterior margin of the loose lamina of the fifth lumbar vertebra. There has been a definite correlation between this condition and the symptoms of coccygeal pain which these patients sometimes exhibit. The authors believe that the majority of patients with symptomatic spondylolisthesis show radicular symptoms in addition to the local ache and tenderness in the lumbo-sacral area. Careful neurological examination of most of these patients reveals involvement of the fifth lumbar and, in some cases, of the first sacral nerve root. Surgical exploration has consistently revealed nerve-root compression by a mass of fibro-cartilaginous tissue at the defect in the *pars interarticularis* of the fifth lumbar vertebra. Movement of the loose lamina may, in addition, cause nerve-root and dural irritation and compression. Surgical decompression and separation of adhesions between the *ligamentum flavum* and the dura have given relief of the radicular symptoms of the low back pain.

On The Periphery.

". . . PARTICULARLY GLOUCESTERSHIRE . . ."

IN Gloucestershire, between the River Severn and the southern prolongation of the Cotswold Hills, lies Berkeley, once a thriving town but now a quiet village set amidst some of the most beautiful of English countryside. Here, on the site of the present post office, opposite the old hospital, Edward Jenner was born just over two centuries ago. Here, after almost a lifetime humbly devoted to the care of his patients in the surrounding district, his leisure hours spent in the study of bird life and the collection of specimens for his insatiably curious friend Hunter in London, he was buried. Were it not for the prodigious amount of time which he gave to the cause of vaccination, his "Inquiry into the Causes and Effects of the Variolæ Vaccinæ, a Disease discovered in some of the Western Counties of England, particularly Gloucestershire, and known by the name of 'The Cow Pox'" might well be regarded as a comparatively incidental theme in the life of a busy country general practitioner and a keen natural historian. Certainly it is the round, rubicund, friendly face of the former which looks down benignly on those entering the hall of the Royal Society of Medicine in London.

The traveller to Berkeley may take a route well known to doctors and patients long before Jenner's day: the road to Bath, formerly a fashionable resort, popularized, to use a modern term, during the eighteenth century by Beau Nash and his friends. The Roman road to "Aquæ Sulis" has long since disappeared. Silchester, the main town through which it passed, was extensively excavated in the last century, but it has once again sunk below ground level to become a ploughed field and a turkey farm. After some initial difficulty, the site may be identified notably by the well-preserved wall, some minor excavation, and the countless scattered fragments of Roman tile. The present road follows the eighteenth century coach route (Dick Turpin had his choice of 1800 coaches a day on Hounslow Heath, where it begins), passing from the Thames Valley across the central plateau which in the south forms Salisbury Plains. The curious tourist and the earnest historian will detour together to see the quaint village of Avebury, not far from Marlborough, which has grown up in the middle of a strange prehistoric monument, reputedly older, certainly more extensive, and in some ways more impressive than its better known counterpart to the south, Stonehenge. A mile or two further on, the enormous cone of Silbury Hill, the work of primitive man for some mysterious purpose, dominates the road.

Bath itself, frequently visited by Jenner, contains much of medical interest. The only natural hot springs in the country are, as is well known to this day, "efficacious in rheumatism, gout, sciatica, dyspepsia, biliary and liver complaints, and skin diseases". In the interests of science it is perhaps worth noting that at least one leading London physician of Jenner's era (John Fothergill, in general an advocate of "the waters") was inclined to limit the value of Bath to certain types of gout. Be that as it may, the waters of Bath may still be had in the old Pump Room, hard by the remarkably complete remains of the Roman baths, traces of which were first rediscovered exactly two hundred years ago. The magnificent view of the city from Beechen Cliff is perhaps more attractive than a close view of the famous limestone terraces of Georgian houses, architecturally satisfying, but of stifling stolidity, "cabin'd, cribbed, confined".

From Bath the way to Berkeley is by minor roads through country of faultless beauty, past Sodbury, where a patient's casual remark that an attack of cowpox conferred protection from smallpox became a vivid memory to the apprentice Jenner. Now there comes a rapid succession of hills and valleys, dotted with villages built of the characteristic Cotswold stone, with here and there an occasional prehistoric barrow. The steep narrow streets of Wooton-Under-Edge, literally nestling against the hillside, saw Jenner as a schoolboy. Beyond from the winding road the view extends across the Severn Valley, beyond Berkeley a few miles away, and across the river to the low hills of Monmouthshire. Truly the country for a naturalist; one can appreciate Jenner's preference for it rather than the hustle and bustle, the noise and the smoke, of London.

In Berkeley, a seventeenth century shop, with its overhanging upper storey and complicated wrought-iron scrollwork, stands on the corner of a narrow street leading off to the left. On the left of this street lie the grounds of The Chantry, at present, as before Jenner, the vicarage, where Jenner spent much of his life. Beyond it is the church of St. Mary the Virgin, standing at the south-west corner of the twelfth century Berkeley Castle, of which indeed it formed an important outer defensive position. The castle, not at present open to visitors, remains impresive, having contrived to preserve much of its character despite later additions. It is best known as the site of the murder of the deposed King Edward II (1307-1327). In the church a toad surmounting a head depicted on the wall refers to the toad, supposed to have lived in the castle dungeons, to which superfluous prisoners were thrown. Jenner sometimes visited the home of the Earl of Berkeley, and indeed he prepared and released a newfangled hydrogen balloon from it at the annual fair in 1783, no doubt much to the wonderment of the assembled villagers.

The early English church (the nave was built in the time of Edward I, and the south and north aisles in the fourteenth centry) is singularly attractive, the interior particularly so, where the highly coloured mediæval scrollwork has been admirably restored. Beside the central figure of Christ, the adjacent panels of the east window, erected in 1873 in memory of Jenner, portray scenes of healing. Immediately beneath it, beside the altar, a worn stone in the floor, some of the names on which can be read only with difficulty, indicates the burial place of several members of the Jenner family; among them is mentioned Edward Jenner, with the year, 1823. It is as unpretentious as he would have wished.

Outside the north door a path leads across to the detached tower of the church. To the left may be seen the former home of the boy Phipps, on whom Jenner performed the first deliberate vaccination in May, 1796. It is now the home of the verger, who kindly showed us a photograph of it as it was in other years. To the right and beyond the tower is the pleasant garden of The Chantry. Hidden in the trees beside the dividing wall is the summer house in which so many from the district and from afar were vaccinated by the busy local practitioner. The roof has been rethatched, but the brick and "slab" walls and door are unchanged. The chimney from the tiny grate winds its way partly around the building before turning upwards—a strange "surgery" for so famous a man. An iron ring and chain behind the door to which, according to local tradition, Jenner tethered his calf, are now gone; perhaps this is not so unfortunate, for much of the importance of Jenner's work lay in the effective perpetuation of cowpox without further reference to the animal host.

Some sixteen miles away at Gloucester there may be found in the Cathedral, in addition to the elaborate tomb of the unfortunate Edward II, a very simple marble statue standing at the entrance to the nave, facing the altar; beneath it is the single word "Jenner". Another well-executed statue stands, appropriately enough, in Kensington Gardens, not far from Peter Pan. Relics of Jenner are to be found in various museums, probably the best collection being in the possession of the Wellcome Historical Medical Museum. Owing to limitations of space these items are not on display, although it so happens that a pair of his own vaccinating lancets can be seen at present, but a reference to the catalogue of the books, manuscripts and relics placed on view to commemorate the bicentenary of 1949 indicates the scope and richness of the collection.

It is perhaps of interest to recall that Jenner, on the recommendation of John Hunter, was appointed to assist Sir Joseph Banks to "examine and prepare" the natural history specimens brought back by Captain Cook from the voyage of 1771. As a result he was offered the post of naturalist to the expedition of 1772, which he declined. The introduction of vaccination to Australia was not accomplished without a struggle, a struggle which led to the publication of the first paper on a medical subject to appear in this country—Thomas Jamison's "General Observations on the Smallpox", *The Sydney Gazette*, October 14, 1804 (Ford, 1954) and to the "Sydney Reprint" of Jenner's "Inquiry" in 1884 (Ford, 1951).

BRYAN GANDEVIA.

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Medical Education.

THE POST-GRADUATE EDUCATION OF THE PRACTISING DOCTOR.

THE third of a series of conferences on medical education was held at the Stawell Hall, 147 Macquarie Street, Sydney, on May 23, 1955. The conference had been convened by the Post-Graduate Committee in Medicine in the University of Sydney and all members of the medical profession had been invited to attend. DR. V. M. COPPLESON, Honorary Director of the Post-Graduate Committee, occupied the chair.

DR. V. M. COPPLESON said that the meeting was the third in the Post-Graduate Committee's series of conferences on medical education. It dealt particularly with the post-graduate education of the practising doctor.

In the panel were Dr. R. J. Jackson, a senior country general practitioner and a past president of the Northern District Medical Association; Dr. B. A. Cook, President of the Federation of Country Local Associations and a general practitioner in an extrametropolitan industrial area; Dr. C. Warburton, a suburban general practitioner and a representative of the New South Wales Chapter of the College of General Practitioners; Dr. K. S. Jones, a member of the Council of the New South Wales Branch of the British Medical Association; Dr. Douglas Anderson, physician, presenting the role of the written word in the continuing education of the practising doctor; Professor B. T. Mayes, Professor of Obstetrics in the University of Sydney and a member of the Post-Graduate Committee in Medicine; and Dr. Selwyn Nelson, physician, Assistant Honorary Director of the Post-Graduate Committee in Medicine. Professor Lorimer Dods opened the discussion.

DR. R. J. JACKSON said that what he had been asked to speak about was divided into two sections; the first included the requirements of general practitioners in post-graduate education from the general aspects, and the second had to do with suggestions for future changes in the existing policy.

There was evident one requirement that was common to all. That requirement was the time-immemorial and ever-increasing need year by year to learn new procedures and new therapies with special attention to the evaluation of remedies, as had been discussed in an editorial article of THE MEDICAL JOURNAL OF AUSTRALIA some two weeks before. It was equally important that the practising doctor should learn to modify his former methods in accordance with new knowledge.

This need was met only by correct and efficient post-graduate teaching, and by teaching was meant not merely lecturing but also demonstrating and supervising actual work done.

Amongst the most effective groups of post-graduate teaching bodies over the last twenty years in New South Wales were: (*a*) the annual general revision course of the Post-Graduate Committee in Medicine in the University of Sydney; (*b*) the annual five-day post-graduate course of the Federation of New South Wales Country Local Associations—F.O.C.L.A. to wit; (*c*) the various week-end courses organized annually by most of the fourteen local associations situated outside the area of the County of Cumberland (they embraced the remainder of the State); (*d*) the week-end courses recently organized and carried through by the New South Wales Faculty of the College of General Practitioners.

Right at the outset it had to be stated that the average country general practitioner was in a category that was not the same as that of suburban colleagues. His requirements were different and his responsibilities were heavier, because in many cases he had to shoulder them alone. It was estimated by experienced country practitioners that for doctors practising in small country centres the greatest problems and biggest worries were the acute abdominal emergencies and the results of violent trauma. The ruptured ectopic pregnancies, ruptured spleens and livers, and acute intestinal obstructions were all severe tests of a doctor's competency. Then the fractures, compound and complex, of limbs, skull and spine—sometimes with multiple extensive wounds—were all particularly difficult problems; and still more so if there loomed up medico-legal consequences.

Dr. Jackson added that one more requirement of the post-graduate education of the country general practitioner was to appreciate the fact that there could, and did generally, exist a mutual, sound respect between city consultant and country practitioner for each other's work.

Another general aspect of the country general practitioner's requirement in post-graduate education was the self-education through the media of journals—weeklies, monthlies and yearlies. There were, of course, doctors who unblushingly stated they had neither time nor energy to read their journals systematically. Out of their own mouths they condemned themselves. The time they spent telling all and sundry how busy they were, if spent in regular study, could eventually result in the development in them of that most wholesome and most to be desired quality in all doctors—humility.

The average country doctor was well catered for in the matter of journals by the following: *British Medical Journal*, THE MEDICAL JOURNAL OF AUSTRALIA, *The Bulletin of the Post-Graduate Committee in Medicine in the University of Sydney, The Australian and New Zealand General Practitioner, The Lancet*, and that virtually indispensable publication which was to be found on the desk of every practising doctor and was being constantly referred to—namely, the fourth (1954) edition of the "Physician's Index of Australia and New Zealand".

In regard to suggestions for future changes in the existing policy, Dr. Jackson said that he would state them succinctly with little elucidation. Criticism and evaluation of them would follow in the discussion later during the evening. First, the annual general revision course should be shortened to one week, each day's programme should be lengthened, and the course should include appropriate practical work. Secondly, for the two courses at six-monthly intervals, select lecturers of proved lecturing ability and teaching efficiency should be selected, and in the list of lecturers practising general practitioners from both capital and province should be included. Thirdly, in lieu of a metropolitan post-graduate teaching hospital, steps might be taken with the board of directors of a city hospital to have one ward in that hospital used for post-graduate teaching. To avoid waste of time spent in travelling, the closer such a hospital was to the Stawell Hall, the more useful it would be for the purpose.

If the existing policy was directed to such changes, it was Dr. Jackson's opinion that before many years had passed doctors practising in country areas would recognize that they could not afford not to attend an annual general revision course at regular intervals.

Dr. Jackson asked what were the marks of an acceptable post-graduate teacher. They were, of course, the marks that interlocked with those of the serious and purposeful—and therefore acceptable—post-graduate student.

A very experienced and very competent colleague who practised in a large northern New South Wales centre had made the following statement apropos of the effectiveness as teachers of those who lectured to post-graduate groups of country practitioners:

> At the post-graduate level, I feel that the essentially practical outlook of the lecturer and his sympathetic understanding of the difficulties of isolated country practitioners must be kept in mind. No Post-Graduate Committee organising any course of lectures should ever send a pure "researcher" to talk to an audience which includes, to a large degree, doctors who practise in one or two man towns.

That arresting statement contained the germ of the improvement in lecture subjects.

Finally, Dr. Jackson gave a few suggestions for improvement in lecturing. The lecturer should be an experienced and competent practising doctor. He should be selected for his proved ability to deliver a worthwhile address because of his meticulous attention to the essentials of good lecturing—namely, material, manner, method. His addresses, particularly to country doctors, should be fresh preparations, not the rehash of a dish first cooked up for some previous occasion. His allusions should be appropriate and his quotations be lifted from the best of the literature of the English and other national languages. He should find in the Bible his good examples and his finest inspiration. If he took pains to deliver a professional address of that standard to an audience of country practising doctors, he would feel the approval of his audience and sense the success of his address.

DR. B. A. COOK said that he had not many concrete proposals, but he was covering the field in a broad sort of way and hoped that might be helpful. He practised in an industrial and semi-rural area, close to the city in a sense, and their problems were somewhat different from those of Dr. Jackson's area, which was primarily a rural community.

In addition, they had large industrial undertakings, with big numbers of workers—the steel works alone had over 8000 employees—and that meant a lot of accidents; they had trauma as one of their pressing problems all the time; they had many roadside accidents as well, apart from the general emergencies of general practice.

The problem, as Dr. Cook saw it from a general practitioner's point of view, was to take the recent graduate, fresh from his intensive study of the science of medicine, and to adapt him to be a practitioner of its art. Further, from the point of view of the country general practitioner, he had to be completely self-reliant in the handling of the daily crises and emergencies that confronted him. He had to be thoroughly *au fait* with the "know-how" of practical medicine, which, in the case of the country general practitioner, meant medical, surgical, pædiatric and obstetrical practice. He might be 300 or 400 miles from the city and had not the consultant at his elbow.

The country practitioner had á greater moral obligation than his suburban colleague to make himself efficient and to know what to do. If he neglected post-graduate education he was falling down on his job.

Dr. Cook referred to psychosomatic problems. One of the yardsticks of a successful general practitioner was his ability to handle psychosomatic problems, as they frequently occurred in general practice. The practitioner was usually far from the centres where he could have such patients admitted to hospital and get them out of his way, if the condition was a borderline case. But many of his problems were fringing on the abnormal, and he had to be able to integrate the home environment, the outlook of the patient, his personality and so forth, with his somatic symptoms. If he failed to recognize the background of his patient, he was just beating the air.

Dr. Cook believed that if general practitioners were taught to explore the home set-up of the patient, to explore the family and the personal interrelationships of many patients, they would be saved a lot of meddlesome exploring, for example, in a pelvis that was quite normal.

Dr. Cook thought that the recent graduates, at least the ones he saw, did not seem to be alive to those problems.

As President of the Federation of Country Local Associations, Dr. Cook said that he was deeply appreciative of the efforts of the Post-Graduate Committee in Medicine in the matter of subjects for talks and lecturers. Generally speaking the local associations had been more and more concentrating on the clinical knowledge of members already in general practice, and were not catering so much for the needs of the recent graduate, and emphasis had always been on the practical side. They had tried to choose lecturers more for their clinical knowledge and experience than for academic brilliance.

Always, too, during courses they had been at pains to put out a *questionnaire* to find out just what people thought of the courses, and very often remarks were very frank

One problem remained the same, and that was to adapt the young fellow who could tell one the blood levels of every electrolyte and the cell content of every organ in the body. Very often he fell down when he was asked to treat a patient with, say, simple influenza. He was likely to call on "Chloromycetin" and "Terramycin" and all "the works". He just could not face the problem of making the patient comfortable while Nature, as always, effected the cure. The remedy probably lay in apprenticeship to a recognized general practitioner, who would be able to teach that the art of medicine was as important as its science.

DR. C. WARBURTON said that he was a suburban practitioner representing the College of General Practitioners. There were four basic problems confronting the suburban practitioner. First came opportunity: the suburban practitioner was having greater and greater difficulty in obtaining an appointment on the staff of his district hospital. The second had to do with the doctor's time. As the family doctor became more established, one of the most frustrating problems that confronted him was time. It was difficult to find time to carry out practice at a professional level consistent with conscience, and at the same time to undertake regular post-graduate study. The third problem was professional isolation of the family doctor. There was no regular contact with colleagues of similar standing and so an absence of fellowship with the resultant lack of kindly and sometimes even caustic criticism which was necessary to him. The fourth problem was the lack of an incentive. Without hospital appointments and without sufficient time for proper post-graduate education the general practitioner needed some incentive to stimulate his interest and to encourage him on his way.

Dr. Warburton referred to the general policy of the College and what it had to offer in dealing with the problems. It was the College's policy "to encourage and stimulate the practising doctor in post-graduate study and so stimulate his enthusiasm in the study of medicine in its broadest sense", and, in the words of the first President of the College of General Practitioners in Canada, Dr. Stalker, "It will be the function of the College to lead, to stimulate, to reward, and to find ways to overcome, at least in part, that serious handicap—the isolation of the general practitioner".

The following were the ways in which the problems outlined were being dealt with. In regard to post-graduate gatherings a series of post-graduate week-end gatherings had been commenced, the idea being to hold them within one hundred miles of Sydney so as to enable the country and metropolitan practitioners to meet and, at the same time, to stimulate their interest in the recent advances in the problems that confronted them in everyday general practice. At these meetings the doctors were accompanied by their wives, who thereby assisted in providing social, as well as academic, activities. The first of these week-end courses had been held in November, 1954, at Moss Vale, and the second was to take place at Kiama on June 24. In regard to undergraduate training, the College had already commenced voluntary student training in general practice. The plan was yet in its teething stage, but it promised to provide an opportunity for the medical student to see something of the life and work of the general practitioner. For the family doctor it provided a real stimulus to his education and should help greatly to enrich the quality of his work.

Research in general practice was another form of post-graduate education. Here also a beginning had been made in the epidemiology and clinical picture of infective hepatitis as seen in general practice. A study of eclampsia was also under way.

In regard to future plans, it was the intention of the College to assist the recently registered and unestablished practitioners by the formation of an Institute of General Practice where complete information regarding the methods and general organization of a first-class general practice might be obtained. On that subject, Stephen Taylor in his book on general practice wrote:

> Occupational fatigue is as much a product of the badly organised practice as of the badly organised factory. Some doctors have so designed their premises and planned their work that they experience little of the drudgery of which so many complain. They have large lists but are seldom in a hurry or over-tired. Because they have time and tools to hand they practise better medicine.

In a similar manner by such an Institute of General Practice an attempt would be made to advise young graduates so that their time might be spent more efficiently to the advantage of their patients, their families and themselves.

Referring to liason with university and teaching hospitals, Dr. Warburton said that in England there was a growing tendency to include general practitioners in teaching posts in medical schools and hospitals. The stimulus of academic work not only assured a more balanced training for the undergraduate; it also contributed a great deal to the status and education of the practitioner. In some parts of England general practitioners were being coopted to the post-graduate committee of the universities. In New South Wales it would be the policy of the College to cooperate in every way possible with the Post-Graduate Committee in the University of Sydney.

It was not, of course, for the College to carry out the work of a post-graduate committee, but to encourage its members to participate in the various post-graduate sessions that were available and to pass on information to the Post-Graduate Committee regarding the basic needs of the practising doctor. The College planned to extend its present post-graduate meetings by holding a long week-end course in a large country town each year, and also by holding an interstate congress at a capital city in conjunction with other regional faculties at three-yearly intervals.

The Mater Misericordiæ Hospital, North Sydney, and the Royal Newcastle Hospital had made available post-graduate residencies for the general practitioner; an extension of that system might be advisable. Furthermore staff appointments of general practitioners, as in England, to public hospitals provided valuable teaching opportunities.

The provision of some higher status—an incentive for the general practitioner towards some academic or cultural goal—seemed necessary. General practitioner organizations in America and Canada, as well as the College of General Practitioners, had rejected examination and had based their

membership on a pledge to do an agreed amount of post-graduate study each year. Overseas study as an important part of post-graduate education was equally applicable to the general practitioner as to the specialist. Already Butterworth and Company had donated a gold medal to be presented annually for an essay to be written by a member of the College. Perhaps in the future others might provide funds for travelling scholarships for a general practitioner.

Lastly, Dr. Warburton referred to the Cinderella of post-graduate education, instruction in the basic sciences of physiology and anatomy. He said that in these there was a real need for some elementary post-graduate course. It was not only in the more practical aspects of medicine and surgery that advances had occurred; many practitioners felt the need for instruction in physiology and anatomy.

It was hoped that the College would have a stimulating effect on the standards and academic ambitions of many general practitioners, for, as Sir William Osler had said about medical education: "It is not a College course, nor a medical course, but a life course." Many had forgotten the truth of those words and it would be the duty of the College to remind them.

DR. K. S. JONES, on behalf of the New South Wales Branch of the British Medical Association, said that he appreciated the opportunity to speak on the subject. Among the objects of the British Medical Association was the ideal of continuing the education of the practising doctor. The necessity for this education was obvious to any who took time to think upon the subject, but the fulfilment of the ideal was far from being achieved, and to that end this conference had been thought advisable.

The British Medical Association took the view that continuing medical education was vitally necessary especially on three counts. They were, first, to afford the best attention to the patient in relation to the latest knowledge, secondly, to ensure that a medical man should retain his own scientific self-respect, and thirdly, to avoid the raising of academic barriers among members of the profession.

The first two counts were self-evident, but with the increasing complexity of modern medical life Dr. Jones felt that the third count was assuming more and more importance. Should the combined efforts of the various medical organizations fail to attract men to continue their education in large numbers, then they would find a great class distinction developing between those who had further studied and those who had not.

Accordingly, over the years, the British Medical Association (New South Wales Branch) had developed the following programme of post-graduate education: Branch meetings, sectional meetings, provision of lecturers for local association meetings, clinical meetings, the establishment of an extensive library. Dr. Jones proposed to say a few words about each of these aspects in turn.

It was a popular conception that Branch meetings were in the nature of medico-political meetings. They were not. They were scientific meetings, and were held every month; once annually the Branch meeting was held in a country centre. Generally the meeting took the form of a short symposium on a subject of fairly universal interest to the practising profession. The attendances varied somewhat in accordance with the subject matter, but generally the meetings were not well attended. Rather noticeable was the large percentage of the same faithful followers in the audience. Dr. Jones felt that the meetings would be better attended if decentralization was further pursued, as the one meeting held each year in a country centre had been well supported. Perhaps the idea could be extended with benefit to the holding of Branch meetings in suburban areas.

The various Sections represented the specialized branches of medicine within the British Medical Association and held meetings which were open to all members. They were of value both to the practising specialist and to the general practitioners. In this they did a great service, as the medical man interested in particular subjects was enabled to gain the benefit of listening to and discussing his interests with those of the profession who concentrated their labours in the various restricted fields of medicine.

Of recent years, the Branch had initiated the policy of finding suitable lecturers who visited clinical meetings held by local associations. These meetings were mainly held in country areas, and the practice was proving popular and beneficial. The stimulation provided by the up-to-date knowledge offered to men who were debarred by distance from regular attendance at the more numerous sessions held in the city appeared to be very popular. It raised the thought that country men were more anxious to continue to educate themselves than were their city brethren. Perhaps that was in part due to the necessity for keeping abreast of knowledge in the absence of easily obtainable consultants' advice.

Clinical meetings were held every month for ten months of the year at the larger metropolitan hospitals. They took the form of demonstrations of cases by members of the staff of the host hospital and were open to all members of the profession. Their present form seemed to raise considerable doubt as to their utility, and Dr. Jones felt that this was reflected in the small attendances. He asked for suggestions from the audience whether the presentation of a large number of clinical cases, often of rare nature, was of real value, and similarly, whether a heterogeneous collection of medical or surgical achievements by any one man was preferable to a smaller series of symposia delivered on more practical subjects and illustrated by suitable clinical cases.

Finally, the Association had in its building an extensive and well-kept library. The services were open to all members, and far greater use could be made of it by medical men. Later in the evening Dr. Anderson would give some indication of how much use was made of it. Again Dr. Jones invited practical suggestions whereby the vast collection of knowledge could be more widely disseminated.

Dr. Jones then mentioned one other activity of the British Medical Association at large, although Dr. Douglas Anderson was to speak more fully about it later; he referred to the production of the *British Medical Journal*.

In conclusion, Dr. Jones speculated on the factors entering into competition with the continuance of the education of the practising doctor. He said that surely these were the increasing size of a man's practice, the increasing size of his family with their encroachment on his time, and finally, only too often, a self-complacency engendered by admiration from his patients and by financial success in life. Post-graduate education should commence by arousing a self-criticism of the individual's own knowledge, and Dr. Jones thought that once this had been established any one of those present would find the truth in what Francis Bacon had written: "Studies serve for delight, for ornament and for ability."

DR. DOUGLAS ANDERSON said that there was only one way to find out the value of the printed word in post-graduate medical education, and that was to find out what use the doctors made of it. And the only way to find that out was to ask them. Accordingly, when he was invited to take part in the discussion, Dr. Anderson sent out a *questionnaire* to 80 general practitioners, 50 in the city and 30 in the country, all personally well known to him, asking them what they read and whether they could suggest ways in which their journals could be more helpful in keeping them professionally up to date.

Seventy-seven out of the 80 had returned the *questionnaire*, which was a much better response than he had ventured to hope for, and which he thought must indicate a lively general interest in the subject under discussion. Every one of the 77 doctors who returned the *questionnaire* signed his name to it.

Dr. Anderson said that his first question related to THE MEDICAL JOURNAL OF AUSTRALIA. There was not a single doctor who said that he seldom or never opened his journal, which, Dr. Anderson thought, was "one in the eye" for the cynics, although there were three who never looked at the *British Medical Journal*. Table I showed how the various sections of THE MEDICAL JOURNAL OF AUSTRALIA were read. It would be seen that the "Special Articles for the Clinician" were by far the most generally read contributions to the journal. It was one of the curiosities of medical literature that the articles which were most popular with the doctor should be relegated to the back pages of the journal, and also that the articles which the doctors most desired to read should be in such short supply that the Editor had to pay for them, while material of much less general interest should be supplied and distributed freely in very great quantity. The next most popular feature of the journal was the correspondence. Dr. Anderson suggested that that made it all the more pity that letters to the Editor did not find their way a little more promptly into print. He thought that a lot of subjects which were controversial and of general interest rather lost their news value by the delay which must take place between the exchanges. The Federal Council news, strangely enough, was of less interest to general practitioners than any other part of the journal. Even the reports of meetings were more often read. The popularity of the editorial pages was clearly an indication that doctors found the "Current Comment" very helpful in keeping them abreast of current medical thought, and it

was also, he suggested, an indication of the powerful influence wielded within the profession by the Editor.

The second question in the *questionnaire* was: "Can you suggest any way in which the journal could be more helpful in keeping you professionally up to date?" Forty-three doctors contributed suggestions.

The suggestion that recurred again and again was that articles embodying medical research, experimental medicine, epidemiology and statistics should be fewer, and should be more stringently selected and drastically pruned and carefully summarized, and that there should be more articles of a practical nature designed to help the general practitioner

TABLE I.

How 77 General Practitioners Read "The Medical Journal of Australia".

Section of Journal.	Generally.	Occasionally.	Seldom or Never.
Cover to cover	14	19	44
Original articles	31	41	5
Book reviews	26	32	19
Editorials	37	26	14
Abstracts	26	33	23
Special articles for the clinician ..	54	17	6
Reports of meetings	20	27	30
Federal Council news	24	14	39
Correspondence	51	19	7
Obituaries	40	19	18

of medicine in his work. As one doctor put it: "A lot of this scientific stuff is not worth two bob. It should be cut to the bone. What we want is what we can follow." Presidential addresses were referred to in scathing terms by several doctors. One doctor suggested that a "Questions and Answers" department should be started, as in the *British Medical Journal*; several suggested that the "Special Articles for the Clinician" should be a permanent feature; two suggested regular reports on new drugs, in which their official and trade names, dosages and indications would be set out; others demanded seminars by specialists and general practitioners on subjects of general interest in which recent advances had been made, such as hypertension,

TABLE II.

How 77 General Practitioners Read the "British Medical Journal".

Section.	Generally.	Occasionally.	Seldom or Never.
Cover to cover	6	15	56
Original articles	31	34	12
Book reviews	17	38	22
Editorials	26	25	26
Refresher course	50	18	9
Correspondence	33	25	19
Any questions	44	18	15
Obituaries	10	18	49

menorrhagia and stiffness of the shoulder. Dr. Anderson had not time to mention all the suggestions. The impression he had gained was that the general practitioner had little time for reading and was often tired when he settled down to it. He opened his journal feeling that he must not allow himself to become rusty. He opened its pages in the mood of the man who sought a crock of gold at the foot of the rainbow, and if he did not find any gold he was apt to be disappointed and even exasperated.

The third question was about the *British Medical Journal*, and Table II showed how the various sections of it were read. The popularity of the refresher course and "Any *Questions*" showed the hunger of the general practitioner for material that would help him in his practical work. The other figures showed that he was not so keen on what a former assistant editor of the *British Medical Journal* had recently described in a magazine article as the professional advertising of "the hucksters in Harley Street".[1]

Only 18 doctors had any suggestions to make for the improvement of the *British Medical Journal*, and these suggestions were on much the same lines as those made for THE MEDICAL JOURNAL OF AUSTRALIA.

[1] G. Ostler (1955), "Hucksters in Harley Street", *Punch*, 228:170.

Dr. Anderson's fifth question asked what other journals doctors subscribed to. Table III showed the number of journals doctors took in by subscription.

Table IV showed the number of doctors subscribing to individual journals. The majority clearly felt the need of other medical literature than that which came in THE MEDICAL JOURNAL OF AUSTRALIA and in the *British Medical Journal*. The specialist journals were mostly taken in by city general practitioners holding junior appointments at public hospitals. About six or eight doctors made laudatory comments on *The General Practitioner*, so Dr. Anderson inquired for it at the British Medical Association Library. He was told that it was "no longer received" there. Another journal which came in for laudatory comment was *Illustrated*

TABLE III.

Number of Journals Subscribed to by 77 General Practitioners.

Number of Journals.	Number of Doctors.
None	24
One	19
Two	16
Three	9
Four	4
Five	2
Six	1
Seven	1
Twelve	1
Total	77

Medicine. One funny fellow listed *The Reader's Digest* among the medical journals which he regularly received.

Dr. Anderson's sixth question was: "Do you obtain any help from periodicals circulated by drug houses? If so, please name any such periodicals that you sometimes find stimulating." Thirty-two of the seventy-seven doctors said that they obtained no help and some said so with great vehemence. But no less than 21 doctors mentioned *Therapeutic Notes* as a stimulating publication, 21 mentioned *What's New*, eight mentioned *A Medical Bulletin* and four

TABLE IV.

Number of Journals Subscribed to by 77 General Practitioners.

Name of Journal.	Number of Subscriptions.
The Bulletin of the Post-Graduate Committee in Medicine in the University of Sydney	21
The General Practitioner	19
The Lancet	11
The Post-Graduate Medical Journal	8
Medical Clinics of North America	7
The British Encyclopædia of Medical Practice	6
The Journal of the American Medical Association	4
The Practitioner	3
Post-Graduate Medicine	3
Illustrated Medicine	2
Abstracts of World Medicine	2
The American Practitioner	2
Twenty-nine specialist and hospital journals	41

mentioned *Excerpta Sandoz*. *Spectrum* and *Seminar* received two mentions each and three other publications one each. Dr. Anderson thought that some of the doctors might have been more stimulated than helped by some of the journals mentioned.

The seventh question, relating to advertising literature sent through the post, had elicited the information that 21 doctors frequently found it helpful, 47 occasionally and seven seldom or never.

The eighth question was: "On an average, how many books do you buy in a year?" Table V showed the answer to that question.

The average worked out at between two and three books a year. Several doctors added a rider to their answers to this question, to the effect that they bought the books full of good intentions, but "hardly ever read 'em". However, it was clear that the large majority who bought books did "read 'em". Several comments were made in praise of "The

Medical Annual", which Dr. Anderson had classified as a book rather than as a periodical.

Apart from books which were bought, many were borrowed from libraries. For instance, nineteen doctors in Albury and Wodonga, who were on the staff of the Albury Base Hospital, subscribed three guineas a year to the hospital library and had acquired a collection of practical books, which they kept up to date and found of constant value in their practices. In Sydney there were good libraries at each of the teaching hospitals, and each year about 750 doctors (one doctor out of every four in New South Wales) borrowed about 1200 books and 4000 journals from the British Medical Association Library. Apart from these borrowers, about

TABLE V.

Number of Books Bought in a Year by 73 General Practitioners.

Number of Books.	Number of Doctors.
None	3
One	18
Two	22
Three	18
Four	3
Five	2
Six	1
Seven	2
Eight	1
Nine	1
Ten	2

20 doctors called at the library every day to consult books and journals on the spot. Many country doctors used the Branch library, the books and journals being sent to them by post.

That was all the information which Dr. Anderson had obtained, and the upshot of his inquiry seemed to be that the great majority of general practitioners in New South Wales had a keen appetite for the printed word to keep them professionally up to date, that they were discriminating and critical readers and that they appreciated their journals, but thought that more should be done in the compilation of those journals to cater for their particular needs.

PROFESSOR BRUCE T. MAYES said that he had been asked to speak of the position of the university and the teaching hospitals and the part they might be able to play in helping the practising doctor. His remarks, therefore, would be confined to the general practitioner.

Graduates could be grouped into neo-graduates (the first two or three years) and paleo-graduates. What could the university and teaching hospitals do for these two groups?

The university did a lot for the education of the specialist. But what of the other groups? The fresh graduate in a teaching hospital could also benefit from the university. In the teaching hospital he was in constant contact with university teachers, the university departments were readily accessible to him, and as a resident medical officer he could be an unofficial (but valuable) tutor to the students studying in his hospital. In fact, although it might not be generally known, a resident medical officer in a teaching hospital undertook as a condition of his appointment the elementary tuition of the student in his hospital; this was particularly helpful in obstetrics. The resident student supervisor was of special value in this respect.

In addition to medicine and surgery the young graduate should be thoroughly taught how to give a good anæsthetic and become expert, as he could, in intravenous therapy and transfusion. Obstetrics and pædiatrics, unfortunately, were still the post-graduate privilege only of the few. Extension of these facilities was necessary even if for the time it might appear difficult.

Many general practitioners five to ten years after graduation asked Professor Mayes how they could get some practical obstetrical training, even for a few months.

When a graduate left the hospital and embarked on practice in the real sense of the word, Professor Mayes wondered just how far the university could continue to take a part in his education; he wondered still more how far the graduate wanted the university to do so. He would ask the audience in the end to give him the answer to that question.

As to the hospitals, it seemed to him that in them lay the major source of what they might be pleased to call education. In this respect they should look further afield than the limited number of teaching hospitals.

Hospitals could provide further education for the practising doctors in ways that were well known to those present. By residence as a post-graduate student for a few months, by post-graduate courses lasting a week or a fortnight, by the development of annual reunions in all the larger hospitals, town and country hospitals could bring doctors together in a professional and social atmosphere which had real value.

Hospitals seemed to be the focus of post-graduate education for the doctor who wanted to revise and bring up to date that knowledge which he might get theoretically by reading his journals.

The flow of knowledge and judgement was by no means in one direction. Professor Mayes had suggested that a very good post-graduate week could be staged in Sydney by getting the senior practitioners of the country town to come to the city and relate their experience. He referred to the article in THE MEDICAL JOURNAL OF AUSTRALIA of May 21, 1955, by Paul Hopkins, of Mackay, Queensland. If ever there was anything that should become a classic it was that article. The assessment of results by Hopkins over twenty-five years, the way he approached everything, and the standard of his practice, should be an example to every general practitioner who practised obstetrics.

Finally Professor Mayes reminded himself that there were two forms of education: the form that was given, and the form that one gave oneself; the second was the more important. Ultimately it must rest with the doctor himself what he got out of the university and the hospital.

Professor Mayes concluded by asking what the practising doctor wanted. The conference that evening was an opportunity to find out. The seed of satisfaction was in giving a person what he wanted, and it was to be hoped that in the conference they might find the answer.

DR. SELWYN NELSON said that in 1892 William Henry Welch at an annual dinner of the Harvard Medical School Association had said that medical education was not completed at the medical school: it was only begun. Hence it was not only the quantity of knowledge which the student took with him from the school which would help him in his future work; it was also the quality of mind, the disciplined habit of correct reasoning, the methods of work, the way of looking at medical problems, the estimate of the value of evidence. Dr. Nelson wished to direct attention to the first part of that—the medical school.

The basic training received at the university medical school must of necessity steep the student in academic disciplines. The increasing complexity of scientific knowledge tended to limit the amount of practical training he received, if the medical course was to be kept within some time limit. It had been pointed out that night that the recent graduate was deficient in practical knowledge. It followed that much of his practical experience had to be gained in the years immediately following graduation. As a graduate, then, his immediate need in the first years of practice was a widening of his capacity to apply in practice the vast store of theoretical knowledge accumulated during his academic years. There were some who thought that there should be more practical training at the undergraduate stage. But too much concentration on practical problems, to the detriment of the sound academic foundation, might well result in degradation of the graduate to the status of an ignorant technician.

Apart from factual knowledge, however, the recent graduate carried with him what Dr. Welch said was "the quality of mind, the disciplined habit of correct reasoning, the methods of work, the way of looking at medical problems, the estimate of the value of evidence", and at that stage he entered his training in hospital.

Once the need for this training was properly recognized and steps were taken to improve its duration and scope, fewer complaints should be heard of the incompetence of the recent graduate to cope with the emergencies of general practice. The lack of realization that recent graduates were not practically trained in the fullest sense was associated with a lack of adequate facilities to implement their practical training. It was idle to look to a post-graduate course of lectures to give this complement to the academic undergraduate course. For both specialist and general practitioner, therefore, a basic training in the practice of medicine was a prerequisite for his life's work as a practising doctor.

For general practice, which required skill and a resourcefulness of a very special order, formal training was limited. Some gained this by apprenticeship; most learned by experience.

The problem under discussion was basically: "What is the most efficient method for the practising doctor to adopt which will fulfil the requirement of continued education?" The companion problem was: "How may the agencies which offer educational assistance to the practising doctor best fulfil this requirement?"

Medicine was a hard taskmaster. It demanded of the doctor, in all forms of practice, constant and often exhausting work attending to the sick. It also required him constantly to master and apply new techniques. Finally, as much of his work was unsupervised, it required of him a standard of which his own conscience was often the sole monitor.

The continuing education of the practising doctor, therefore, demanded that he make an effort, by his own decision and without expectation of additional reward, to increase his knowledge and skill. Realizing his difficulties, he needed help to accomplish this. They had heard that night of the written word, of the value of courses and scientific meetings.

Medical films, which had not been mentioned, offered some easily assimilated instruction in selected subjects. In the United States of America closed-circuit telecasts were used to bring to the isolated doctor presentations of scientific value from important medical centres. It would in the not-too-distant future be possible to exploit this teaching method in Australia.

In the reading of journals it was possible to cover a lot of ground by the proper use of the summary and by the reading of abstracts. This would save the busy practitioner a lot of time and wasted energy.

Dr. Nelson noted with interest the small number of doctors who read their journals from cover to cover, and also Dr. Anderson's comment on the relative popularity of certain items in the medical journals. He thought that in order to use the written word by the most efficient means and also to save time, a reading of the summaries and the careful reading of the articles which offered some help to the particular reader would be a method which could be employed to a greater degree.

Turning now to the work of the Post-Graduate Committee over the past twenty years, Dr. Nelson said that certain routines of course presentation had been developed by the committee—an annual revision course, country courses, week-end courses in special subjects and the annual subscription course—which included lectures by distinguished overseas medical men. They had even had courses in how to lecture, delivered by distinguished educationists. They had every reason to be grateful to the teachers for their willing cooperation. Some criticism of the practising profession might be merited. The Post-Graduate Committee had been worried at times by the comparatively small percentage of the total population of practitioners who had attended courses. They had noted that those who did were among the more enlightened and busy of the practising doctors, while those who did not come often would seem to have more leisure than those who did. It had seemed that, as in other matters, the busy practitioner could find time to do something extra for his continuing education, while the less busy was unable to fit it in. Surely this argued that there must be some quality of mind, or some capacity of organization, which enabled the good man to realize the need for improvement, and to take steps to arrange it, while the other type neither realized nor remedied his incompetence. The maintenance of good medical standards demanded that the practising doctor should use every method available to him to keep himself abreast of current thought and practice.

DR. V. M. COPPLESON, before calling on Professor Lorimer Dods to open the discussion, welcomed the representatives of various associations who were present.

PROFESSOR LORIMER DODS said that he had very little to add except a few nebulous generalizations which might appear like a glimpse of the obvious. At first sight it might appear sufficient to supply the practising doctor with single infusions of medical knowledge given at appropriate intervals. But it was Professor Dods's impression that the single infusion technique was not enough. If the practising doctor was to achieve and maintain an adequate knowledge of his subject, then he needed that genuine and lasting interest which was going to promote and maintain a self-administered continuous infusion of medical knowledge which might be aided and abetted by the short single infusions provided by organized post-graduate courses.

This represented an extraordinarily important basic principle behind the subject of the training of the practising doctor; this was Osler's "life course" quoted by Dr. Warburton, it was the education which the man gave to himself as defined by Professor Mayes. For this reason and for many others, it was the particular responsibility of teachers to do everything they could to stimulate this genuine interest amongst undergraduates and house physicians.

Professor Dods did not propose to attempt a discussion of various techniques of post-graduate teaching, but wished to emphasize the obvious importance of free discussion and argument and to stress the well-known hazards which surrounded the traditional didactic lecture. The post-graduate should be protected as much as possible from formal lectures and clinical sermons—the teacher should come down from the pulpit and talk with the post-graduate rather than at him—travel some of the clinical road with him, asking for and facing his questions and sharing with him the responsibility of finding some of the answers.

Professor Dods concluded with a plea which he hoped would not be misunderstood, a plea for serious consideration of the possibility of making some slight reduction in the number of post-graduate courses, seminars, lectures and demonstrations; he had a feeling that if this steadily increasing number of teaching exercises went on increasing, they might have a stultifying rather than a stimulating effect on post-graduate teaching in the State.

DR. V. M. COPPLESON then threw the subject open for discussion.

DR. R. E. BOSANQUET said that he was amongst those who had been fortunate enough to attend a post-graduate course of lectures. That course had been admirable from the point of view of lectures and theoretical application of medicine, but he wished to seek further post-graduate education in hospital. When he said "in hospital", he meant as a "resident" rather than as an appendage in a teaching hospital or one of the major hospitals. As an appendage he had found himself in the rather unenviable position of encroaching on the domains of the resident staff of that hospital. It was a most awkward situation. He pleaded with the Post-Graduate Committee to make available to general practitioners an opportunity of going into residence in hospitals where they would assume responsibility and where they would actually assist at the operations instead of watching. If this was done it would be necessary to know in advance when appointments would come due; otherwise it would be impossible from the practitioner's point of view, as he would have to make arrangements some time in advance.

DR. JOHN WITTON FLYNN said that on behalf of the New South Wales Medical Board he wished to make a request of them in regard to the very important part they could play in the education of the "new" graduate. He referred particularly to those men from country centres. It was the duty of the Medical Board to see that newly graduated doctors were sent to country hospitals when the metropolitan hospitals had filled their vacancies. All had a responsibility to ensure for them a sound practical training. He therefore wished, on behalf of the Medical Board, to make a strong plea that the position of the recent graduate would be fully appreciated, and that he would be regarded as one who deserved—commanded, it might be said—the best possible teaching and solicitude from the practitioners in the district to which he was sent.

Of course Dr. Flynn realized that a lot would depend on the character and personality of the young doctor—it would be easier to help some than others. The Medical Board had had complaints from some that they had not been satisfied with their "hospital" year. Naturally opinions differed whether better training was received at the large teaching hospitals or at smaller places where individual tuition could be given and more practical experience could be acquired. It was not part of Dr. Flynn's desire even to comment on this aspect. He concluded by asking everybody who had the opportunity to do their very best in the future for the young graduates entrusted to their care.

DR. V. M. COPPLESON said that the Post-Graduate Committee was interested in the problem mentioned by Dr. Flynn, and it had under consideration at the moment the appointment of somebody to go into the question and to report to the Post-Graduate Committee on what was happening about the training of first-year resident medical officers. The matter would come up at the next meeting of the committee, and it was hoped that someone would be appointed specially for that purpose.

DR. DOUGLAS ANDERSON interposed there that he understood that the Sydney University Medical Society was circulating a *questionnaire* to each medical graduate of the University of Sydney who had done his resident year in a

country hospital, asking him to answer a list of questions as to what his impressions were of the medical education he received during that year, and asking for his suggestions as to what improvements might be made, and what more might be done for those graduates who had to spend their post-graduate year in the country hospital.

DR. ELLEN M. KENT HUGHES said that in the country they had the opportunity to realize some of the deficiencies of the teaching in medical schools as it affected general practice. When one first met the residents one found that there was no foundation on which to build. Some of the young fellows had never even given a hypodermic injection, nor had they put in or taken out sutures. They did not know how to apply the simplest dressing, nor had they been instructed how to carry out such an important investigation as the examination of a child's ear drum. They did not know how to instruct a mother how to hold a baby whilst the throat was examined and were totally ignorant of other practical points of this kind.

Some of them had told her that sisters held classes in practical procedures, but as attendance was not compulsory, and examinations were not held in such matters, attendances were poor. Surely after six years' study students should know that the only reliable way to take a baby's temperature was in the rectum, and that it was useless to place a thermometer in a little child's mouth. He either bit it or spat it out. Students did appear to have a better grounding in their obstetrics than in any other branches of medicine. That was the general opinion of her colleagues.

If the young graduates intended to be general practitioners and they knew so little at the close of their course, everything depended on the training they received as residents. How handicapped they would be in their first practice if they had not had sound experience in a children's ward!

Another young graduate had told her that they were not taught what instruments to use for even ordinary operations; the last two or three residents she had met did not know the difference between a pair of tissue forceps and a pair of artery forceps. They had no idea how to clamp a pair of artery forceps on a bleeding point. They said that nowadays there were so many senior residents, junior residents, registrars, junior honoraries, assistant honoraries *et cetera* that in the operating theatre the students could hardly catch a glimpse of the patient, much less of the operation. Therefore their time in the theatre was practically wasted.

As general practice was under discussion Dr. Kent Hughes said that it might be mentioned that the undergraduate seemed to get the wrong slant about general practitioners in big teaching hospitals. He looked upon them as belonging to a very inferior race as compared with the specialist. He hoped sincerely that his lot would not be theirs, and that he would either be a specialist or get into the Government service—a specialist because people would revere them and pay them well, and the Government service because it meant regular hours and security.

Finally, as students seemed not to be so well equipped as nurses or ambulance bearers to deal with the ordinary emergencies of general practice, a definite arrangement should be made that all hospitals where residents were placed should be required to carry out a scheme of training.

DR. V. M. COPPLESON said that there were a certain number of questions that they wanted answered by the panel. The first was:

> Does the panel consider that post-graduate medical education is being undertaken by too many bodies and whether the sum of their effort is not too great?

He went on to say that people had at times asked why the Post-Graduate Committee in Medicine was helping various other organizations which appeared to be in opposition to it. The reason was that the Post-Graduate Committee had long ago adopted the attitude that it was not only interested in conducting courses itself, but regarded it as part of its job also to foster post-graduate work wherever it appeared in New South Wales. That had been the policy, and for that reason the committee had assisted many of the hospitals in regard to their courses. It had assisted the country associations and the Colleges, and any organization that wanted to carry on post-graduate work in New South Wales could always look to the committee for assistance. He asked Dr. Cook to express his views.

DR. B. A. COOK said that he had been surprised to hear Professor Dods suggest that there were too many diverse attempts at post-graduate education. Dr. Cook did not think there could be too much post-graduate education. The number who used available facilities was so small that the more opportunities that were given, the less excuse there might be for neglect. It might be that some of the efforts were duplicated, and that was a matter for argument. That was where the Post-Graduate Committee, with its prestige and its better organization, could direct and help and stimulate those people who were trying, along different lines, perhaps, to foster and even to coordinate post-graduate education.

DR. C. WARBURTON, speaking on behalf of the College of General Practitioners, agreed with the Post-Graduate Committee in that it was in the best interests of all to foster as many bodies as possible; he thought particularly for the College. The College understood that it was young and was just beginning. "F.O.C.L.A." was also a comparatively new body, and it was his hope that some day the two bodies might become one, and that when they became one, or even before that, they would really be part of the Post-Graduate Committee in Medicine, not a separate entity.

DR. W. A. CONOLLY said that there were two points which should be brought to the attention of the meeting. An endeavour had been made in England, and the College was endeavouring to follow suit in Australia, to go back to the old days of apprenticeship. The College intended to ask members if they would accept young graduates as assistants, to train the younger practitioners in the art of general practice. The second thought was with the older practitioners. The College had two hospitals they could attend: the Mater Misericordiæ Hospital at North Sydney and the Royal Newcastle Hospital.

It had been said that the same old faces turned up at meetings; the College would help there, because one of the conditions of membership was that post-graduate training would be carried out regularly. In America where they formed the College of General Practitioners the condition was that they had to spend so many hours every three years. At the end of their last year those members of the College who had not done their work had been automatically disqualified from membership. The College in Australia had not got so far as that, but they did foster the work of the Committee and they believed that as a College they would do a lot to get those people interested in post-graduate work who were not interested at the moment.

DR. L. N. FERRARI mentioned what he regarded as two fundamental issues; one might be aimed at the university and the second at the general organization of practices in the State and in Australia.

In regard to the university, Dr. Ferrari suggested that at such time as the university produced sufficient graduates to allow a practising doctor the opportunity to undertake post-graduate study, then a start was being made on the right trail. It had been suggested that junior men should be taken as assistants. The present situation was fantastic, for those who wanted assistants or partners just could not find them. Until such time as sufficient numbers were coming into the profession, those who were organizing their practices could not possibly undertake post-graduate work.

The second matter was also of fundamental importance. Many men in the country had appointments at their own local hospitals, and with those appointments they had the responsibility of looking after their own patients. On the contrary, there were many men in the city who had not the responsibility of looking after their own patients in hospitals and had not the incentive to carry on real post-graduate work. Until such time as the general practitioner was given more responsible positions on hospital staffs, it would be impossible to give him a real interest in post-graduate work.

DR. L. T. SHEA proposed to ask three questions which he would answer himself: "What education do the practising doctors want?", "What do we give them?", and "What could we give them?". Dr. Shea thought that the older men liked the newscast type of thing—they had a broad interest in everything that was new and everything that was going—the younger men had a more topical interest in the problems of the day. Between the two of them it was very difficult to cater for both in the one session. From his experience of the courses in the past, the type of people attending would take any amount of first-class stuff. In regard to "What do we give them?", they were getting on to more dangerous ground. They had the University of Sydney, the various hospitals, their own medical journal, various lectures and courses by various agencies, an excellent collection of films and some first-class libraries. That looked like a fairly efficient set up; but what use was made of the faculties in an organized fashion?

The university, particularly in the basic stuff, was not interested in post-graduate education. Dr. Shea admitted

that he might be treading on corns, but from his point of view that was the truth. That was a facet which could be explored and would lead to the better education of the practising doctor.

In regard to the hospitals, they had an imposing array, and the only ones brought to the notice of anyone were the teaching hospitals. The teaching hospitals had been primarily concerned with turning out undergraduates. It seemed that the standard of the undergraduate, as turned out by the hospitals and as reported by some of the speakers, was not what it could be. It would seem that there was a large field of clinical material untouched in the suburban hospitals. They were more or less Cinderellas of teaching, and there the general practitioners might come into it. If undergraduates could be sent there they would get a better basic training, and the training a man received should be primarily clinical. Lectures and courses, Dr. Shea thought, did very well up to a point.

Most of the films which Dr. Shea had seen were not of outstanding quality. The libraries were first class, and would be used more if the general education of practitioners was better. Specialists seemed to use the libraries much more than anyone else.

The third question was: "What could we give?" Dr. Shea said that he had dealt with that. He added that the suburban hospitals "ought to be brought into it". Undergraduate and general practitioner training should be given in the suburban hospitals, and the city hospitals could attend to specialist training.

DR. NORMAN WYNDHAM said that he spoke in two capacities—as a member of the staff of a teaching hospital and as a Fellow of the Royal Australasian College of Surgeons. First of all he agreed entirely with Dr. Kent Hughes. The time had come when they should review, as they did from time to time, the training of the undergraduate. He would, however, ask all experienced practitioners to be as kind and as charitable in their minds as possible. This might be assisted by trying to exercise their memories and to recall what they were like when they graduated. When he himself graduated he had not given a hypodermic injection and had not given an enema. In spite of that, he found no difficulty in country practice; in fact, as anyone would agree, the experience in country practice was something of inestimable value throughout life. If they all looked back, they learned their practical work after graduation.

He was particularly interested in the training of surgeons after graduation, not only from the point of view of a specialty, but from the point of view of general practice. He would stress, first of all, the view that for a person to sit for and obtain a higher surgical qualification did not of necessity mean that he must have a specialist practice in a certain street in a certain city. The time had come when the training for higher surgical qualifications was something which resulted in the dissemination throughout the country of people, perhaps, who did not do surgery all their time, but who really were first-class surgeons.

As far as surgery in general practice was concerned, how could they see that people were trained in surgery? It was not of necessity only through obtaining a higher qualification. In the old days, and in the present day, Australia had produced not only in the suburbs of Sydney, but in the big country towns, absolutely first-class surgeons. How did they do it? They did it through a wealth of experience, through hard work, through application and through self-tuition. So, speaking as a surgeon specialist, he wanted to point out that it was not necessary for general practitioner surgeons to gain a higher surgical qualification. It would be good discipline to do so and should not be under-estimated, but self-training was still a distinct possibility.

One important thing—apart from the actual discipline of work—was experience. In the city it was a pity if general practitioners were dissociated from their surgical patients, and it would be wrong if it was not possible for many practitioners to maintain their service in suburban hospitals where a good consultant service was available.

If a person was going to become skilled in a certain surgical procedure, he could not get skill by operating in only one or two cases a year. If there were only a few cases they should be dealt with by one man. If in a country town two or three common bile duct lesions were operated on annually, it was a pity if those cases were divided amongst various people in that country town. Doctors ought to be divided amongst various people in that country town. Doctors ought to be broad-minded and help one another to specialize in certain types of medical or surgical work; it did not matter whether they happened to be in the same team or in the same practice. This was true also in city practice. Dr. Wyndham believed that practitioners should do that surgery, and, if necessary, plenty of it, for which they were qualified and for which their conscience told them they were fitted.

DR. V. M. COPPLESON then closed the discussion, but before closing the meeting referred to the questions of decentralizing Branch meetings of the British Medical Association and holding more than one of them each year away from headquarters; and whether clinical meetings held in metropolitan hospitals by the British Medical Association should continue in their present form.

Those who spoke shortly on these points included Dr. B. A. Cook, Dr. R. J. Jackson, Dr. K. S. Jones, Dr. C. Warburton, Professor B. T. Mayes and Dr. Selwyn Nelson, but no motion was put to the meeting.

The meeting closed with a vote of thanks to the members of the panel.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

TREATMENT OF THE NATIVES.[1]

[From the diary of Joseph Arnold, M.D., F.L.S., July 13, 1815.]

THE natives about the colony seem to be as rude and savage as ever: there are many more of them living about Sydney than when I was here before. Old Benelong is dead. Philip told me he died after a short illness about 2 years ago and that they burried him and his wife at Kissing Point. They seem to be more cunning and artful than previously and are equally fond of drink. I saw them often so drunk that they could not stand. Governor McQuarrie a few months ago made a sort of settlement for them at Middle Head and appointed old Bungaree chief, putting a medal about his neck and cloathing him: he gave them also a farm and implements of husbandry, and convicts to instruct them how to till the ground. I was told however that it was a foolish business, that they will not work on their farm, that they leave it to ruin, that old Bungaree threw away his medal and cloathing, and that no good was done. I believe the mode of proceeding was improper as there certainly might be something done for them. Mr. Surgeon Forster of the 46th saw a native of Port Hacking with a large tumour growing to his breast of six or eight pounds weight. He offered to admit the man into the Military Hospital and cut it off: the savage consented, came into the hospital, remained there a week, took what medicine was required bore the operation quietly (at which Sir John Jamison acted as assistant), attended regularly till the part was treated, and then went away.

Correspondence.

PROLAPSED ARM AND CORD.

SIR: A Chinese *multipara* in labour was brought in to me from an outlying "kebun" because of an arm presentation, which was luckily viewed with the utmost suspicion by the native midwife. On examination the cervix was fully dilated, with the head passing the ischial spines in the left occipito-anterior position, and the left arm fully extended beside the head. The fœtal condition was good, and there were no other complications; so labour was allowed to proceed normally. With the descent of the head into the pelvis, the hand appeared externally, and grasping movements were seen to be occurring with infreasing frequency. At this stage a prolapsed cord appeared beside the hand, which latter firmly grasped the cord almost immediately. The grip was maintained and seemed to arrest further descent of the cord.

[1] From the original in the Mitchell Library, Sydney.

While infiltrating the perineum and vaginal floor with 2% procaine, the cord pulsations rapidly slowed and finally all but ceased. An episiotomy and rapid forceps extraction under local anæsthesia, followed by "Coramine" 1·7 cubic centimetres into an umbilical vein, produced a healthy living infant, whose only disability was a swollen left arm for twenty-four hours or so after delivery. This precocious appearance of grasping movements (virtually occurring *in utero*), with a grip maintained for several minutes, was no doubt occasioned by the fœtal distress, and possibly contributed to by the procaine infiltration, which was commenced as soon as the cord appeared. As an apparent example of cooperation between fœtus and obstetrician it was unequalled in my experience.

Yours, etc.,

Segama Estate,
Lahad Datu,
North Borneo.
November 17, 1955.

G. M. MOODIE, M.B., B.S. (Sydney).

THE PRESENT POSITION OF THE ARMY MEDICAL SERVICES IN AUSTRALIA: A NATIONAL SCANDAL.

SIR: I have read, with deep attention, the editorial of November 5, 1955, wherein the present position of the Army Medical Services in Australia is described as a "national scandal".

The unattractive features of medical work in the service are well known, and there is no doubt that if pay and privileges were increased to a point where army service became a profitable part-time occupation, the deficiency of medical officers would soon disappear. This is to admit that medical men are in no way superior, or inferior, in their sense of duty and obligation to the nation than any other citizen who seeks to practise his occupation with not only satisfaction, but also profit. It appears that the Army Medical Service will indeed create highly favourable conditions for service, at which point the "scandal" may presumably subside ("Stop Press", November 5, 1955). In short, it seems that an economic cure for the scandal is there for the asking—or paying.

But this is not all—nor can it ever be. Pay increases to a fabulous level may fill up the gaps in the Royal Australian Army Medical Corps, but a scandal can only be dealt with by exposing, finally, a deficiency in moral conduct in certain places. The editorial goes on to suggest this very deficiency when it states "it is the bounden duty of every medical graduate of military age to look into this matter and accept his responsibility". Here then is the heart of the matter. It is implied that the profession in this country, despite a shining record of national service and devotion in 1939-1945, has so deteriorated in character and moral fibre that it has bred a national scandal within ten years. This allegation I choose to refute with considerable energy. I speak not only for myself, but a substantial body of my contemporaries. I maintain there is no scandal involved in the deficiency of army medical officers. There is simply a very good cause, and the more I study this cause, the more moral—that is, the less scandalous—I find it.

The Director-General of Medical Services has, I think, been too fond of issuing manifestos to the daily Press concerning his difficulties in obtaining medical officers for the service. The tone of these statements has become increasingly critical, even petulant. For instance, the public recently read that young doctors in Australia were "too absorbed in making money", and that attempts were being made to attract British doctors to the Royal Australian Army Medical Corps. (Whether the Australian doctor will be stung into activity by the arrival of friendly mercenaries remains to be seen.) Meanwhile, it would be a simple excursion for the Director-General of Medical Services to leave his rostrum and seek out in person, say, fifty doctors of military age at the rate of one per day. Such a number exist within twenty minutes of Victoria Barracks. He could then confirm first hand whether or not this "scandal" is real, or whether it exists only in the minds of those who see nothing but scandal when their will meets frustration. I make this suggestion in all seriousness; it is unorthodox, and perhaps lacks the dignity which befits the high office of Director-General of Medical Services. I assume, however, that the truth is desired, and who needs humility as much as he who seeks the truth?

The truth is that throughout the profession is a core of military age individuals which is not shirking its moral obligations, but rather is striving to find where its obligations truly lie. This core comprises many men whose past record contains much to commend them in the sphere of national exertion and sacrifice. They are men to whom service life, and war itself, is not strange; who gave a lot without regret in 1939 and after, and would do it again—if the issue was the same as it was in 1939. But the issue is not the same—although in many ways it is clearer. These men believe war—never a moral instrument—is now not even a political instrument. These men—no more or less moral than any other men—see nothing in the modern conception of war but world suicide. They have had time to realize that valour on the war field is now an outmoded quality, since it no longer matters how one fights, but rather with what one fights. The conception of victory has been rejected, since it is incompatible with bilateral suicide. Many can no longer find a spiritual, or even a pragmatic, springboard from which to initiate a personal move toward what is still called "military preparedness".

These men are neither moral nor physical cowards. The convictions set out above are simple deductions from contemporary history and available scientific facts. The acceptance of this history and these facts calls, I feel, for more courage than to remain indifferent to them.

These men are not disloyal; they seek only to establish the object of their loyalty. Obedience is not necessarily loyalty.

They are not idealists, for they deal with today's realities, refusing to base thought or action on precedents or optimism.

They are not men in a personal dilemma. They are, however, well aware that our nation faces a dilemma, itself a segment of the world's dilemma.

They are not "defeatists". They are merely aware that we are involved in an utterly new form of contest, one which must be won without force—or not at all.

They are not pessimists, for pessimism sets in only when constructive thought has finished.

They do not lack energy or will, any more than any man who still holds life dear.

These men see war as a disease, an aberration of human behaviour, its causes traceable if looked for with energy, its management possible if attacked with discipline. Is it strange, therefore, that such men are unwilling to set about the prevention of war by assuming the appearance of one who is about to inflict it? Did we tackle tuberculosis by training ourselves to expectorate just in case someone expectorated upon us?

Here, then, are some of the doctors who it is felt have contributed to the national scandal of deficiencies in the Royal Australian Army Medical Corps. Whether to scourge them, or weep for them, it would be better done quickly, for we are living in what is undoubtedly a decisive century, perhaps decade, of man's existence.

I believe that if a scandal exists within the profession, then it lives among those members who at present are consuming these precious days by a promotion of expedient to the detriment of truth. That the profession itself should persist in such a travesty of one of its own basic teachings goes beyond scandal, and into shame.

Yours, etc.,

248 Queen's Parade,
Clifton Hill,
Victoria.
Undated.

W. S. BENWELL, M.B., B.S.

LARYNGEAL SWABS FOR THE DETECTION OF TUBERCLE BACILLI IN PATIENTS WITHOUT SPUTUM.

SIR: It was with interest that I read the paper by Campbell, Kelly and Banks (M. J. AUSTRALIA, November 19, 1955) favouring the use of laryngeal swabs for the detection of tubercle bacilli in patients without sputum. Hitherto the chief protagonist for their use has been Armstrong (1951), who made a comparison in 967 samples between laryngeal swabs and gastric lavage, and formed the opinion that one swab was "a somewhat superior specimen" to one lavage and that three consecutive swabs were almost twice as valuable in giving positive cultures as one lavage. Since, however, two entirely different media were used for the two types of specimen and the method of treating the gastric lavage specimens in this study was one which would certainly have biased the results greatly in favour of

laryngeal swabs, not much weight can be attached to his conclusions.

Chaves, Peizer and Widelock (1953), in a comparative study of the effectiveness of laryngeal swabs and gastric aspiration, found that a set of two swabs was only 72% as effective as a single gastric lavage. This result is significant in view of the fact that they immediately placed the swabs in trisodium phosphate, but left their gastric specimens in the refrigerator for twenty-four hours without any digestant or neutralization, a factor which would certainly have reduced the number of positive cultures in the gastric material. In a recent paper, Lind and Lundin (1955) reached the conclusion that the use of laryngeal swabs cannot replace gastric aspiration.

Recently, at the Laboratory of Microbiology and Pathology, Brisbane, a comparative study was made of gastric lavage and laryngeal swabs in obtaining positive cultures of *Mycobacterium tuberculosis* in patients attending the Chest Clinic without sputum. The study embraced 1305 examinations by each method on a total of 465 patients. The comparison was a basic one, in that, as far as possible, the same methods of processing and culturing the specimens were used. In our hands, we found one single gastric lavage to be almost twice as effective as three laryngeal swabs in obtaining positive cultures. The rate of growth was slower and the density of growth less in cultures from laryngeal swabs. A report on this investigation has been submitted for publication.

We do not share the enthusiasm of Campbell and his coworkers for the use of laryngeal swabs, and cannot agree with their statement that "laryngeal swabs are a valuable and simple means of obtaining material for culture from patients without sputum and are preferable to gastric culture for out-patients". This statement is particularly surprising since they themselves made no attempt to compare the two methods.

Yours, etc.,

J. I. TONGE, Director.

Laboratory of Micro-Biology and Pathology,
Department of Health and Home Affairs,
Brisbane.
November 28, 1955.

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MEDICAL SERVICE IN PAPUA AND NEW GUINEA.

SIR: Having spent a number of years in Papua, first helping one of the Christian missions and then working as a member of the Government Medical Department, I would commend Papua and New Guinea to younger medical men and women as a worthwhile field of service. This is the case whether one intends to give a lifetime of service to the country or desires to gain some tropical experience before settling in practice elsewhere.

Yours, etc.,

FRED WILLIAMS.

392 Albert Street,
East Melbourne,
November 23, 1955.

THE DEVELOPMENT OF MODERN PSYCHIATRY IN RELATION TO MEDICINE AND SURGERY.

SIR: In your edition of November 19 Dr. McLaren kindly gives a very generous appreciation of my Stawell Prize Essay and discloses an error in it. I wish to thank him for both these considerations.

Dr. McLaren's observation is correct; he has noticed a mistake I made through loose thinking and bad composition. If the sentence "This arc may include afferent and efferent thoughts" be replaced by "This arc may include afferent thought impulses and efferent thought impulses", it would be more correct. In explanation—at one stage I was going to use this portion of the essay to lead up to a discussion of the conscious and subconscious minds and to consider the ability of a person to make a choice or direct his mind. The material I had discussed—afferent and efferent impulse balance—implies compulsion sooner or later. But I did not have time to either prepare adequately or include this section. It was rather carelessly shortened.

If the thought "smoke" be taken (see Case II), it reached the patient's mind after first arising as an exteroceptive impulse, visual or olfactory, and would have involved Cajal's sixth arc. But had the patient, at some other time altogether, mentally induced herself to think "smoke", this would not involve exteroceptive nerves and must therefore be placed differently, probably at a higher level.

In this instance I consider the conscious mind sends an impulse (efferent thought impulse) to the impressed neuronic arc which holds the "smoke" impression; the impulse passes through the neuron or neurons and returns to the mind (afferent thought impulse) bearing the impression which is interpreted as "smoke". Both the original exteroceptive impulse and the impressed neuronic arc impulse bear the same characteristics and therefore finally induce the thought "smoke" in the conscious mind.

Since it is unlikely that I would have myself noticed the error, I thank Dr. McLaren very much for bringing it to my notice, thereby giving me the opportunity to correct a sentence potentially harmful. Would Dr. McLaren express his views on the alteration? It is very difficult to assess the value of one's own ideas, or even to know if they are one's own. In this respect Dr. McLaren's remarks are valued by me, and I appreciate his consideration in commenting on my essay.

Yours, etc.,

H. B. RUDDUCK.

566 Lonsdale Street,
Melbourne,
November 30, 1955.

REGISTRATION AS SPECIALISTS IN QUEENSLAND.

SIR: I am directed by the Medical Board of Queensland to ask that you will be good enough to give publicity to a decision of the Board regarding the qualifications for registration as specialists in Queensland.

The Board has decided that the following diplomas previously recognized as diplomas in the specialties of pædiatrics and obstetrics will no longer be approved as qualifications for specialists' registration: D.C.H., Lond. (Diploma in Child Health), D.Obst., R.C.O.G., Lond. (Diploma in Obstetrics, Royal College of Obstetricians and Gynæcologists, London). The decision on this matter was taken at a meeting of the Board held on December 1, 1955.

Yours, etc.,

RONALD COULSON,
Registrar, The Medical Board of Queensland.

30 Mary Street,
Brisbane,
December 2, 1955.

DISSEMINATED LUPUS ERYTHEMATOSIS.

SIR: Having read with interest Dr. Proust's article on disseminated *lupus erythematosus*, I would like to mention a case of mine.

Mrs. K., a married woman, aged forty-seven years, was first seen in August, 1955. She stated she had been in perfect health until 1948, when she developed weakness and lethargy. She was diagnosed as having "pernicious anæmia and myxœdema". She apparently obtained relief from thyroid tablets and liver injections. In January, 1955, she developed pains in the left wrist, which travelled up the neck and down the right arm. Following a manipulation for "cervical disk lesion" her symptoms were aggravated. She stated she could hardly get about and had to be lifted in and out of bed. She experienced violent headache relieved only by vomiting. She had difficulty in swallowing, and breathing caused pain along both hypochondria.

The salient features on initial examination were as follows: (*a*) Crops of nodules on the anterior aspects of both wrists and the back of the neck. (*b*) Considerable swelling of both ankles and knees with slight swelling of both hands and

wrists; movement was more painful than one would have expected for the degree of swelling. (c) An apical systolic murmur, Grade II.

The following investigations were carried out: X ray, both wrists, normal; hæmoglobin value 11·4 grammes *per centum*; blood sedimentation rate, 12 millimetres per hour; 3000 leucocytes per cubic millimetre (54% neutrophils, 36% lymphocytes, 6% monocytes, 4% eosinophils). Biopsy of a nodule was reported on as follows: "The typical features of a collagen disorder are not seen in this nodule. It is possible the appearances observed could be a reparative stage." Numerous L.E. cells were found in the peripheral blood.

In the pituitrin concentration test the volumes of urine excreted at intervals of one, two and three hours were respectively 70, 30 and 40 cubic centimetres, and the specific gravity readings were 1014, 1019 and 1020.

In the water loading test the hourly volumes were 320, 150, 90 and 30 cubic centimetres (total volume 590 cubic centimetres, amount given one litre), and the specific gravity readings were 1001, 1001, 1011 and 1011.

In September treatment was commenced with cortisone. She is now stabilized on 15 milligrammes of "Meticorten" daily. Her only symptoms are some pain on breathing and minimal stiffness in the fingers. However, she states she sadly lacks energy.

Yours, etc.,

Stockton, New South Wales, November 29, 1955.

KEITH B. WALKER.

QUALIFICATIONS OF MEDICAL DETAILERS.

SIR: May I crave some valuable journal space on a matter of great interest to me personally and also, I think, to the medical profession, to pharmacy and to pharmaceutical manufacturers.

Published in the October issue of the *Australian Journal of Pharmacy* is a letter from Dr. Noel M. Gutteridge, of Brisbane, appealing for recruits to the calling of medical technology. Dr. Gutteridge concludes his letter with these words, and I quote:

> And secondly, because instances have occurred recently where two pharmaceutical manufacturing firms have employed senior laboratory technicians as detail men to interview doctors.
>
> This would seem to be a waste of the highly specialised training which technologists receive, and must accentuate the growing pains of this rapidly extending field of modern medical science.—Yours, etc.

Of course Dr. Gutteridge may intend that these words apply only to a wastage of technical training in the light of the apparent acute shortage of personnel in this calling, but it is possible to infer that he thinks technical training superfluous in a medical detailer. On this inference I would join issue with him.

I think most doctors and pharmacists will agree that it is almost an impossible task for them to keep abreast of the rapid and bewildering progress being made in the development of more effective and specific drugs; I must have seen thousands of unopened journals. It seems to me that if medicine is to obtain the greatest use and benefit from these developments, then the leading manufacturers, who are mainly responsible for the drugs, must also be responsible for the dissemination of knowledge about them; this notwithstanding a certain inevitable element of salesmanship, which is bound to be involved. Such firms as Burroughs Wellcome and Company, May and Baker, Parke, Davis and Company, Roche and many others maintain large research institutions and highly skilled medical and chemical research teams. The proof of their value to mankind is to be found in the thousands of prescriptions written every day for the products they evolve, and again I make due allowance for both the misuse of these products and for the fact that not a few fail to pass final muster. Indeed, it is this same misdirected prescribing that lends weight to my case.

May I quote from a recent advertisement wherein Burroughs Wellcome and Company sought new representatives:

> Applicants . . . should have pharmaceutical qualifications . . . or a sound background of pharmaceutical or medical knowledge. . . . The successful applicant will, after a period of training, be required to call upon doctors. . . .

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED NOVEMBER 26, 1955.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	3(1)	1	4(3	..	1(1)	..	..	..	9
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	..	..	31	..	..	..	2	..	33
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	1	..	..	..	..	..	..	1
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	1	..	..	..	..	..	..	..	1
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	8(5)	13(12)	7(7)	..	..	..	1	..	29
Diphtheria	1(1)	3(3)	2(2)	1(1)	4(4)	1	..	..	12
Dysentery (Bacillary)	..	..	9(8)	..	3(2)	..	..	..	12
Encephalitis	..	1	..	1(1)	..	..	..	..	2
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	..	..	..	..
Infective Hepatitis	64(43)	127(64)	..	10(3)	5(4)	..	..	..	206
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	..	..	1	..	1
Leptospirosis	..	..	2	..	..	..	..	..	2
Malaria	..	..	1	..	..	..	1	..	2
Meningococcal Infection	2	..	..	..	..	..	..	..	2
Ophthalmia	..	..	..	..	1	..	..	..	1
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	3(2)	2(1)	5(4)	1(1)	1(1)	..	1	..	13
Puerperal Fever	1	..	5	..	..	..	..	..	6
Rubella	..	125(98)	..	16(9)	3(3)	..	..	1	145
Salmonella Infection	..	..	..	1(1)	..	..	..	..	1
Scarlet Fever	19(14)	27(16)	16(8)	9(6)	1(1)	1	..	..	73
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	..	..	..	..	..	..	..
Trachoma	..	..	..	..	20	..	..	..	20
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	27(14)	24(21)	12	1(1)	8(8)	6(2)	1	..	79
Typhoid Fever	..	..	..	..	..	..	..	..	..
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	..	..	..	..	..
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

From my own knowledge and experience I can assure Dr. Gutteridge that a Ph.C. qualification, at most, provides only a foundation upon which to acquire a sound therapeutic understanding of the vast array of modern drugs. I would say that these bigger manufacturing organizations will indeed have to pay even more attention to the technical training of their liaison officers, the medical representatives, who should surely be the most convenient and the most accurate source of information to both doctor and pharmacist. I would be most interested, and so, I think, would these manufacturing firms, to know what the medical profession as a whole thinks about this problem.

Yours, etc.,

Cheltenham, New South Wales, December 2, 1955. K. J. C. JOHNSON, Ph.C., M.P.S.

THE CASTROVIEJO TECHNIQUE IN CATARACT SURGERY.

SIR: As an ophthalmologist I would like to make a plea for the adoption of the Ramon Castroviejo technique in cataract surgery. The operation is much longer, but the results are indefinitely better than as achieved by other methods. I saw Castroviejo do fifty extractions in New York, and never once saw him in any difficulty, and the results were superb. He inserted at least three corneal stitches, and he always wore gloves whilst operating.

Yours, etc.,

105 St. George's Terrace, Perth, November 26, 1955. F. W. SIMPSON.

Medical Societies.

THE LAENNEC SOCIETY (WESTERN AUSTRALIAN DIVISION).

THE Laennec Society (Western Australian Division) held its annual general meeting in Perth on November 1, 1955.

The following office-bearers were elected: *Chairman*, Dr. G. Donnan; *Vice-Chairman*, Dr. F. Heymanson; *Honorary Secretary-Treasurer*, Dr. J. A. Simpson; *Committee Members*, Dr. F. Clark and Dr. H. Elphick.

After the business meeting Dr. H. Elphick gave a talk on his recent trip to Europe and America.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Toch, Walter, regional registration for Urbenville, New South Wales.

Australian Medical Board Proceedings.

QUEENSLAND.

THE following have been registered, pursuant to the provisions of *The Medical Acts, 1939 to 1948*, as duly qualified medical practitioners: Carew-Smyth, Raymond Ponsonby, L.R.C.P., L.R.C.S. (Edinburgh), L.R.F.P. and S. (Glasgow), 1930 (Section 19 (1) (*b*)); Peirce, Paul Aston, M.B., B.S. (Univ. Sydney), 1954 (Section 19 (1) (*a*)).

The following additional qualifications have been registered: Eldred, Bernice Beatrice, D.C.H., R.C.P. and S. (London), 1955; Chalk, Newton Symonds, D.C.H. (London), 1951; M.R.C.P. (Edinburgh), 1952.

The undermentioned have been registered, pursuant to the provisions of *The Medical Acts, 1939 to 1948*, as specialists in the following specialties: Pædiatrics—Eldred, Bernice Beatrice; Chalk, Newton Symonds. Surgery—Ferguson, Edward Stephen Perry. Ophthalmology—Lowth, Lawrence John.

Deaths.

THE following deaths have been announced:

SIMPSON.—Charles John Simpson, on November 28, 1955, at Melbourne.

MEEHAN.—Arthur Vincent Meehan, on December 1, 1955, at Brisbane.

MURRAY.—Andrew Russell Murray, on December 1, 1955, at Brisbane.

FLYNN.—John Witton Flynn, on December 6, 1955, at Sydney.

Diary for the Month.

DEC. 20.—New South Wales Branch, B.M.A.: Ethics Committee.

DEC. 20.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all contract practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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